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13 January 1999

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD LOS ANGELES REGION

Ms. Ana Veloz-Townsend
Site Cleanup Unit
California Regional Water Quality Control Board
Los Angeles Region
101 Centre Plaza Drive
Monterey Park, California 91754-2156

Subject: Additional Groundwater Investigation and Quarterly Monitoring Report for October to December 1998 Related to the Jervis B. Webb Company Property at 5030 Firestone Boulevard, South Gate, California
(RWQCB SLIC File No. 744; EKI 961025.02)

Dear Ms. Veloz-Townsend:

On behalf of Jervis B. Webb Company of California ("Webb"), Erler & Kalinowski, Inc. ("EKI") is pleased to submit the enclosed *Additional Groundwater Investigation and Quarterly Monitoring Report for October to December 1998*, dated 7 January 1999. This report describes the investigations completed by EKI at the Webb property located at 5030 Firestone Boulevard in South Gate ("Site") during October through December 1998. These investigations were performed pursuant to the *Project Tasks, Schedule, and Work Plan for Additional Groundwater Investigation and Quarterly Groundwater Monitoring at the Jervis B. Webb Company Property* prepared by EKI, dated 29 September 1998.

As required in the California Regional Water Quality Control Board, Los Angeles Region ("RWQCB") letter to Webb dated September 4, 1998, Webb will continue to perform quarterly groundwater monitoring. A report describing monitoring activities for January through March 1999 will be submitted to the RWQCB in April 1999. EKI is currently preparing a workplan for implementation of soil vapor extraction at the site. We anticipate that this workplan will be submitted in approximately one week.

Please contact us if you have any comments or questions.

Very truly yours,
ERLER & KALINOWSKI, INC.

Steven G. Miller, P.E.
(CE, Cert. 43419)
Project Manager

cc: Mr. Eli Stanesa, Jervis B. Webb Company

Additional Groundwater Investigation and Quarterly Monitoring Report for October to December 1998

Jervis B. Webb Company Property
5030 Firestone Boulevard
South Gate, California

13 January 1999

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Kalinowski, Inc.**

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Additional Groundwater Investigation and Quarterly Monitoring Report for October to December 1998

Jervis B. Webb Company Property
5030 Firestone Boulevard, South Gate, California

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1. INTRODUCTION

Erler & Kalinowski, Inc. ("EKI") has prepared this *Additional Groundwater Investigation and Quarterly Monitoring Report* for the property located at 5030 Firestone Boulevard and 9301 Rayo Avenue in South Gate, California Avenue (collectively referred to as the "Site," see Figure 1). The principal objective of these investigations was to obtain data useful for delineation of the lateral extent of volatile organic compounds ("VOCs") detected in groundwater beneath the Site. These investigations were performed of behalf of the Jervis B. Webb Company ("Webb"). The property at 5030 Firestone Boulevard is owned by Webb ("Webb property") and the adjacent property at 9301 Rayo Avenue is owned by Reliable Steel Building Products, Inc. ("Reliable Steel").

Quarterly monitoring of previously installed groundwater wells was performed concurrent with the additional investigations. The additional groundwater investigation and quarterly monitoring activities described herein were performed in accordance with EKI's, *Project Tasks, Schedule, and Work Plan for Additional Groundwater Investigation and Quarterly Groundwater Monitoring at the Jervis B. Webb Company Property* ("Sampling Plan"), dated 29 September 1998.

The groundwater investigation and monitoring activities documented in this report include (1) Cone Penetrometer Testing ("CPT") for hydrostratigraphic characterization of soil and direct-push sampling of groundwater at nine locations at the Site, (2) soil sampling and installation of groundwater monitoring wells at two locations on the Reliable Steel property, and (3) groundwater sampling at five monitoring wells, including two newly installed wells and three previously existing wells at the Webb property. CPT and direct-push sampling of groundwater was performed on 1 and 2 October 1998. Well installation was performed on 28 October 1998, well development was performed on 3 November 1998, and groundwater sampling was performed on 5 November 1998.

A map showing the results of direct-push sampling of groundwater and proposed locations of two groundwater monitoring wells was submitted to the California Regional Water Quality Control Board, Los Angeles Region ("RWQCB") in EKI's *Transmittal of Results for Additional Groundwater Investigation and Proposed Well Installation at the Jervis B. Webb Company Property*, dated 21 October 1998. The results of direct-push sampling of groundwater are also reported herein.

EKI's investigations of the Site were performed in accordance with applicable guidelines and general requirements of the RWQCB concerning subsurface investigations. EKI investigation activities were performed under the supervision of Mr. Steven G. Miller, P.E., a State of California registered civil engineer.

2. FIELD PROCEDURES

Field and analytical procedures observed during the groundwater investigations at the Site are described in the following sections.

2.1. Utility Clearance

EKI contracted with Subtronic Corporation ("Subtronic") of Concord, California to conduct a subsurface geophysical survey of potential underground utilities located near each of the proposed CPT and soil boring locations at the Site. Subtronic performed a geophysical survey at the Site on 1 October 1998. During the subsurface geophysical survey, utilities crossing portions of the site near proposed work areas were delineated on the ground surface with painted lines. Underground Services Alert ("USA" or Dig Alert) was notified 48-hours prior to the commencement of ground penetrating activities completed on 1 and 2 October and 28 October 1998.

2.2. CPT Investigation and PIPP Direct-Push Groundwater Sampling

2.2.1. CPT Investigation

To provide additional data for characterization of subsurface stratigraphy throughout the investigation area and to delineate the lateral extent of VOCs present in groundwater beneath the Site, CPT and direct-push sampling of groundwater were performed on 1 and 2 October 1998. CPT and direct-push sampling of groundwater were performed by Holguin, Fahan & Associates, Inc. ("HFA") of Irvine, California.

CPT consisted of sleeve friction, cone tip resistance, and pore pressure testing, was and completed at nine locations (see CPT-1 through CPT-9 on Figure 2). CPT-1 was completed to a depth of approximately 90 feet below ground surface ("ft bgs"). CPT-2 through CPT-9 were completed to a depth of approximately 50 ft bgs.

A description of the equipment and methodology used during CPT is provided in the HFA report attached in Appendix A. The CPT provided a log for each location that allows characterization of soil layers present in the subsurface. The CPT logs with interpretations of soil type (i.e., grain size distribution) are attached in Appendix A.

The CPT probes and sampling equipment were decontaminated prior to their use at each testing location. The CPT and sampling equipment were cleaned in a non-phosphate detergent solution in water, then rinsed in potable and distilled water. The CPT probes are

externally decontaminated during installation by use of an automatic decontamination system designed to scrub and spray clean the rods during installation. The decontamination system utilizes a sealed chamber that transfers spent rinsate water to a collection tank. Decontamination water was transferred to a labeled, DOT-approved, 55-gallon drum.

The results of the CPT investigation are discussed in Section 3.

2.2.2. PIPP Direct-Push Groundwater Sampling

Samples of groundwater were collected at each CPT location using a Push-in-Plastic-Piezometer ("PIPP"). At one location (CPT-1), groundwater samples were collected at two depths. PIPP groundwater sampling was performed by HFA.

Groundwater samples were collected using a bottom-emptying Teflon® bailer. The bailer was lowered into the screen section of the PIPP after the PIPP was pushed beneath the groundwater table. Groundwater collected in the bailer was then transferred to containers supplied by the laboratory. A sample label that included a unique sample identification number, the time, and the date when the sample was collected was attached to each container. Groundwater samples were sealed in zip-lock plastic bags and placed in a cooler with ice for temporary storage and transport to Orange Coast Analytical, Inc. laboratory in Tustin, California ("Orange Coast"). A travel blank, which accompanied the sample bottles from the laboratory to the Site, was returned to the laboratory unopened. Chain-of-Custody forms were initiated in the field and transported with the samples. Chain-of-Custody forms and analytical reports provided by Orange Coast are included in Appendix B.

Prior to sampling groundwater at each CPT location, the PIPP and bailer were disassembled and each piece of equipment was thoroughly washed in a non-phosphate detergent solution, and then rinsed with potable and distilled water. An equipment rinsate blank was collected from the sampling bailer immediately following sample collection at location CPT-2.

2.3. Drilling and Soil Sampling Procedures

2.3.1. Soil Boring Installation

Completion of soil borings and installation of groundwater monitoring wells were performed by West Hazmat Drilling Corporation ("West Hazmat") of Anaheim, California on 28 October 1998. EKI performed lithologic logging and selection of soil samples for chemical analysis. Soil characterization was performed in accordance with the Unified Soil Classification System and using Munsell Soil Color Chips. Soil boring logs (see Appendix C) were approved by Ms. Beth Lamb, R.G., C.E.G., C.H. of EKI, a State of California registered geologist.

Two soil borings were completed to a depth of approximately 70 ft bgs. These soil borings were converted to groundwater monitoring wells MW-4 and MW-5, located near the southerly and easterly boundaries of the Site, respectively. The locations of the new wells

(MW-4 and MW-5) and the previously existing groundwater monitoring wells (MW-1, MW-2, and MW-3) at the Webb Property are shown on Figure 2. Well construction details for the monitoring wells are provided in Table 1. Analytical results for samples of soil collected from one soil boring (MW-5) are provided in Table 2. Laboratory reports and Chain-of-Custody forms for soil samples are attached in Appendix D. Boring logs containing lithologic descriptions of soil and depths of soil samples retained for chemical analysis are provided in Appendix C.

Soil borings were completed using a CME-75 drilling rig equipped with 10.25-inch outer-diameter hollow-stem augers. Samples of soil were collected using a 1.5-feet long by 2-inch outer-diameter, California-modified split-spoon sampler. The soil sampler, containing three pre-cleaned, 6-inch brass liners, was driven approximately 18 inches into undisturbed soil at each sampling interval, then retrieved and disassembled. One sample liner was retained for laboratory chemical analysis at selected sampling intervals. The remaining sample liners were utilized for soil characterization. Soil samples not retained for laboratory testing were placed into a labeled, DOT-approved, 55-gallon drum. Soil cuttings generated during completion of soil borings were also placed in labeled, DOT-approved, 55-gallon drums. The drums of cuttings are being stored temporarily at the Site for disposal by Webb.

Soil sample liners retained for laboratory chemical analysis were removed from the sampler after being separated with a clean knife. The ends of the brass liner containing each sample were covered with Teflon® sheets and capped with plastic end caps. A sample label that included a unique sample identification number, the sample depth, the time, and the date when the sample was collected was attached to each brass liner. Samples to be delivered to the laboratory for chemical analysis were sealed in zip-lock plastic bags and placed in a cooler with ice for temporary storage and transport to the laboratory. Chain-of-Custody forms were initiated in the field and transported with the samples. Orange Coast performed analyses of soil samples. Chain-of-Custody forms and laboratory reports provided by Orange Coast are included in Appendix D.

The augers and down-hole sampling equipment were decontaminated prior to each use. Between sampling intervals, the soil sampling tools and brass sample liners were cleaned in a non-phosphate detergent solution in water, then rinsed in potable and distilled water. The rinse water generated during decontamination was contained on-site in labeled, DOT-approved, 55-gallon drums. The drums of waste water are being stored at the Site for disposal by Webb.

2.3.2. Well Construction

Upon completion of boreholes, threaded, pre-cut well materials were assembled and inserted into the boreholes within the hollow-stem augers. Installation of filter packs and seal materials for the wells was then completed. All wells were terminated below grade within a well vault. Details of the construction of each well are shown in Table 1 and on the boring logs provided in Appendix C.

The well design and materials selected were based on soil characterization performed during the previous investigations at the Site. The new wells utilize the same materials used for construction of wells MW-1, MW-2, and MW-3. All wells were constructed with Schedule 40 polyvinyl chloride ("PVC") screen, with 0.010-inch machine-slotted perforations, and Schedule 40 PVC blank casings. All wells were constructed with a 30-feet long perforated screen extending to a total depth of approximately 70 ft bgs.

All wells were constructed with sand filter packs consisting of Lonestar #1C clean sand. Filter packs were installed into the well annulus by pouring the filter sand down the inside of the auger around the well casing. As the sand was poured, the augers were gradually retracted until the desired level of the filter pack was reached. Filter pack materials were poured slowly into the borehole and tamped into place in order to avoid bridging of the sand pack. Filter packs generally extended approximately two vertical feet above the elevation of the top of screen. Approximately five vertical feet of bentonite chips were then placed on top of the filter pack and thoroughly hydrated to form the well transition seal. The groundwater wells were completed from the top of the transition seal to near ground surface using a bentonite slurry poured down the inside of the auger casing.

Completion of each well at the surface consisted of trimming off excess casing below grade and placing an expansion plug or slip-cap on the top of the well casing. Concrete was used to complete the remaining several feet of the borehole annulus to ground surface. A locking brace and 12-inch round well vault with a bolt-down steel cover was cemented into place around each well casing.

The northing and easting coordinates and elevations of the top-of-casing reference points for wells MW-4 and MW-5 were surveyed on 21 December 1998 by Rattray & Associates, Inc. of Los Angeles, California.

2.4. Groundwater Well Development

The newly installed groundwater monitoring wells (MW-4 and MW-5) were developed by West Hazmat on 3 November 1998. Groundwater purge and water quality monitoring forms for well development and groundwater sampling events are attached in Appendix E.

The groundwater wells were developed by bailing sediment from the bottom of the well followed by surging and bailing until the extracted water visually appeared nearly free of sediment. The screened interval of each well was surged using a surge block and rod attached to a cable and pulley operating from the extended tower of the development rig. After bailing and surging, the wells were purged of approximately 5 to 8 casing volumes of groundwater using a submersible, electric pump. All down-hole equipment was thoroughly steam cleaned before use at each well.

During purging, groundwater quality parameters were recorded by EKI (temperature, pH, conductivity, and turbidity). Water quality monitoring equipment was calibrated prior to commencement of the development. For each well, the time, water quality parameters, and

volume of purged groundwater were recorded on field purge forms (see Appendix E). Purging at each well was continued until water quality parameters stabilized to within approximately 10%. Groundwater quality parameters were generally stable after purging three casing volumes of water from each well, and final turbidity was generally low, between 1 and 5 NTU.

2.5. Groundwater Sampling Procedures

Groundwater samples were collected from the new groundwater monitoring wells MW-4 and MW-5 and previously existing wells MW-1, MW-2, and MW-3 on 5 November 1998. The depths to groundwater measured in the monitoring wells are provided in Table 3 and the analytical results for samples of groundwater collected from the wells are provided in Tables 5 and 6. Laboratory reports and Chain-of-Custody forms for groundwater samples are attached in Appendix F.

Prior to sampling of groundwater, each well was purged of a minimum of three well-casing volumes of groundwater using a submersible, electric pump. Groundwater purging was performed by West Hazmat and groundwater samples were collected by EKI. All down-hole equipment was thoroughly steam cleaned before use at each well.

During purging of groundwater on 5 November 1998, groundwater quality parameters were recorded by EKI (temperature, pH, conductivity, and turbidity). Water quality monitoring equipment was calibrated prior to commencement of groundwater purging. For each purge sample, the time, water quality parameters, and volume of purged groundwater were recorded on field purge forms (see Appendix E). Purging at each well was continued until parameters stabilized to within approximately 10%. Groundwater quality parameters were generally stable after purging three casing volumes of water from each well. Final turbidity was generally low, between 0.25 and 2.5 NTU (see Appendix E).

Groundwater samples were collected by EKI using a bottom-emptying Teflon® bailer. Prior to sampling at each well, the bailer was disassembled and each piece of equipment was thoroughly washed in a non-phosphate detergent solution in water, followed by rinsing with potable and distilled water. An equipment rinsate blank was collected from the sampling bailer immediately following sample collection at well MW-2. Monitoring well MW-1 was the last well sampled on 5 November 1998.

A sample label that included a unique sample identification number, the time, and the date when the sample was collected was attached to each container. Groundwater samples were sealed in zip-lock plastic bags and placed in a cooler with ice for temporary storage and transport to the laboratory. A travel blank, which accompanied the sample bottles from the laboratory to the Site, was returned to the laboratory unopened. Chain-of-Custody forms were initiated in the field and included with the samples. Chain-of-Custody forms are included in Appendix F.

3. RESULTS OF SOIL CHARACTERIZATION AND ANALYSIS

3.1. Characterization of Soil

The soil testing performed during this investigation provided data for characterization of the subsurface sediments at the Site. Previous investigations completed by EKI have addressed the structure of subsurface sediments and hydrogeology at the Webb Property. A description of the regional hydrogeology and lithologic conditions at the Webb Property was presented in the *Phase II Groundwater Investigation Report* by EKI, dated 30 June 1998.

CPT was performed at nine locations (CPT-1 through CPT-9) at the Site. Several of the CPT locations were near the location of a soil boring (see Figure 2). Thus, CPT data can be correlated to observations of soil characteristics recorded during logging of the soil borings.

The sediments observed at the Site may be correlated with alluvial deposits of Recent age and associated with the Downey Plain physiographic province, an alluvial depositional feature primarily composed of Quaternary sediments (DWR, 1961). Due to the reported nature of deposition for the Downey Plain Alluvium (i.e. stream channel and overbank splay deposits associated with the Quarternary fluctuations of Los Angeles River), the soil stratigraphy observed at the Site may vary laterally as well as vertically in the immediate vicinity of the property.

Soil present in the vadose zone beneath the Site is characterized by interbedded clay, silt and sand layers. At some depths, as discussed below, predominantly clayey or sandy soils are present and may be continuous throughout the investigation area.

A layer of variable thickness consisting of predominately silty clay, clayey silt, and clay appears to be present under most of the Site between 20 to 30 ft bgs. The thickness of this layer varies from approximately 1 to 5 feet. As noted in the *Phase II Groundwater Investigation Report*, a moderately to highly plastic clay unit of thickness ranging from approximately 1 to 5 feet was observed at a depth of approximately 24 to 26 ft. bgs in soil borings in the vicinity of the building on the Webb property. On the basis of the CPT data, this clay layer may be present throughout the Reliable Steel property as well. This predominately clay layer may be significant in retarding the vertical movement of chemicals though the vadose zone.

A pronounced sandy unit of variable thickness was observed between 30 to 40 ft bgs in most borings. In the vicinity of the borings for wells MW-1, MW-2, and MW-3, this predominately sandy unit was 3 to 5 feet thick. A second pronounced sandy unit was observed between 60 to 70 ft bgs at CPT-1 and each of the soil borings for the groundwater monitoring wells. The base of the second sandy unit was not observed in the soil borings for

the groundwater monitoring wells because each boring terminated at approximately 70 ft bgs. At CPT-1, the sandy unit transitioned to a predominately silty and clayey unit at approximately 70 ft bgs. From 70 to 90 ft bgs at CPT-1, the soil was predominately interbedded silt and clay with some sand. CPT data was not collected below approximately 50 ft bgs at locations CPT-2 through CPT-9.

3.2. Analytical Results for Samples of Soil

Samples of soil collected on 28 November 1998 were analyzed by Orange Coast for VOCs using U.S. Environmental Protection Agency ("EPA") Method 8260. Three samples of soil were collected from soil boring MW-5 at depths of approximately 21 ft bgs, 31 ft bgs, and 41 ft bgs and submitted to Orange Coast for analysis. No soil samples collected from the soil boring at MW-4 were analyzed because this soil boring is located several hundred feet downgradient of the suspected release area. The analytical results for the chemical analyses of soil samples are summarized in Table 2. Chain-of-Custody forms and laboratory reports for the soil samples are attached in Appendix D.

The results of chemical analyses of soil samples collected from soil boring MW-5 indicate that trichloroethene ("TCE") was the only analyte detected at concentrations above method detection limits in these samples. TCE was detected in soil samples collected from soil boring MW-5 at concentrations ranging from 11 micrograms per kilogram ("ug/kg") to 550 ug/kg.

3.2.1. Quality Assurance/Quality Control for Soil Chemical Analyses

Standard laboratory QA/QC procedures used for the project included method blanks and matrix spikes/matrix spike duplicates. Percent recovery of matrix spikes and matrix spike duplicates were within acceptable ranges. No analytes were detected in the method blanks analyzed for the project. QA/QC results are provided with the laboratory reports in Appendix D.

4. RESULTS OF QUARTERLY GROUNDWATER MONITORING

4.1. Measurements of Groundwater Elevation

The depth to groundwater in monitoring wells MW-1 through MW-5 was measured on 8 October and 5 November 1998. These data are provided in Table 3. Contours representing the elevation of the groundwater table on 8 October, 5 November, and 21 December 1998 are shown on Figures 3, 4, and 5, respectively.

As inferred from the contours of groundwater elevation shown on Figures 3, 4, and 5, the direction of groundwater flow at the groundwater table aquifer beneath the Site appears to range from toward the southeast to the south for the monitoring period. For the monitoring event on 5 November 1998, the direction of flow appears to shift toward the west under the Reliable Steel property. However, when the 5 November 1998 contours are compared to the contours for 8 October 1998 and 21 December 1998, the groundwater elevation data for well MW-3 on 5 November 1998 appears unusually low relative to groundwater elevations at nearby wells MW-1 and MW-5. Therefore, the inferred direction of flow to the west in November may be an anomaly.

For the monitoring period, the gradient of the groundwater table was observed to range from approximately 0.006 to 0.009 feet/foot under the Webb property and from approximately 0.002 to 0.006 feet/foot under the Reliable Steel property. The depth to the groundwater table was approximately 43 ft bgs. Based on the data in Table 3, the elevation of the groundwater table at wells MW-1, MW-2, and MW-3 increased an average of approximately 1.3 feet from 27 February 1998 through 5 November 1998.

4.2. Analytical Results for Samples of Groundwater

4.2.1. Results for PIPP Direct-Push Groundwater Samples

The nine samples of groundwater collected using the direct-push sampling method were analyzed by Orange Coast using EPA Method 8260 for VOCs. The results of chemical analyses of these samples are summarized in Table 4 and results for TCE are shown on Figure 6.

TCE was detected in groundwater samples from eight of the nine CPT locations. The highest concentrations of TCE were detected in two groundwater samples from under the Webb property building (CPT-6 and CPT-7). TCE was detected in the groundwater sample CPT-6 at 35,000 ug/L and in CPT-7 at 27,000 ug/L. TCE was not detected in groundwater samples collected at 55 and 95 ft bgs at location CPT-1, the downgradient most sampling location.

Several other VOCs were detected in these groundwater samples, as summarized in Table 4. Some of these VOCs were detected at concentrations exceeding State of California maximum contaminant level ("MCL"). However, the concentrations of these other VOCs are generally much lower that the highest TCE concentrations detected in groundwater samples from the Site.

4.2.2. Results for Quarterly Groundwater Samples from Monitoring Wells

Samples of groundwater were collected from monitoring wells MW-1 through MW-5 on 5 November 1998. In addition, a duplicate sample of groundwater was collected from well MW-5 on 5 November 1998. All samples of groundwater were submitted to Orange Coast for VOC analyses using EPA Method 8260. In addition, analyses for general minerals were performed on two samples of groundwater (MW-2 and MW-4) using various EPA-approved methods. The analytical results for groundwater samples collected during this investigation are summarized in Tables 5 and 6. Concentrations of TCE detected in groundwater samples are graphically summarized on Figure 7. Chain-of-Custody forms and laboratory reports are attached in Appendix F.

Although several VOCs were detected in the samples of groundwater collected on 5 November 1998, TCE was the predominant VOC detected in each sample. The highest concentration of TCE was detected in the groundwater sample from monitoring well MW-1, at 28,000 ug/L. The lowest concentration of TCE was detected in the sample from monitoring well MW-4, at 6.7 ug/L. Based on groundwater gradient data, monitoring well MW-4 appears to be located downgradient of the Webb property building where the highest concentrations of TCE in groundwater have been detected.

In addition to TCE, tetrachloroethene ("PCE"), cis- and trans- 1,2-dichloroethene ("c-1,2-DCE" and t-1,2-DCE"), 1,1-dichloroethene ("1,1-DCE"), and 1,1-dichloroethane ("1,1-DCA") were detected in the samples of groundwater collected from groundwater monitoring wells MW-1 through MW-5. In each sample of groundwater collected, the concentrations of these additional chemicals were generally at least a factor of ten lower than the concentration of TCE detected in the same sample. Toluene, which was detected at a concentration of 13 ug/L in a sample of groundwater from well MW-3 collected on 4 March 1998, was not detected above method detection limits in any of the samples collected on 5 November 1998.

As mentioned in the *Phase II Groundwater Investigation Report* by EKI, dated 30 June 1998, benzene, xylenes, and 1,2-dichloroethane ("1,2-DCA") were detected in the samples of groundwater collected from the former off-site wells DIAL MW-4 and DIAL MW-5 (Dial Corporation). These chemicals were not detected in the samples of groundwater collected from the on-site wells (MW-1 through MW-5) on 5 November 1998.

Some of the VOCs that were detected in samples of groundwater collected during the CPT investigation were not detected in samples of groundwater collected from monitoring wells

MW-1 through MW-5 during quarterly groundwater monitoring on 5 November 1998. These chemicals are acetone, benzene, xylenes, 1,2-DCA, and methyl ethyl ketone ("MEK").

The results of general mineral analyses are reported in Table 6. The concentrations of TDS detected in the samples of groundwater collected from monitoring wells MW-2 and MW-4 were 2,600 and 3,600 mg/L, respectively. Previous analysis of groundwater samples from wells MW-1, MW-2, and MW-3 measured TDS at 1,100 to 2,500 mg/L.

4.2.3. Quality Assurance/Quality Control for Groundwater Chemical Analyses

Standard laboratory QA/QC procedures used for the project included analysis of method blanks and matrix spikes/matrix spike duplicates. Percent recovery of matrix spikes and matrix spike duplicates was within acceptable ranges. No analytes were detected in the method blank samples analyzed for this project. QA/QC results are provided with the laboratory reports in Appendix F.

5. SUMMARY OF FINDINGS

This investigation included a CPT soil investigation, direct-push sampling of groundwater, installation of two new groundwater monitoring wells, and quarterly sampling and analysis of groundwater from five monitoring wells.

The CPT investigation provided soil characterization data at boring locations on both the Webb and Reliable Steel Properties. Previous soil borings had been on the Webb Property only. Soil present in the vadose zone beneath the Site is characterized by interbedded clay, silt and sand layers. At some depths, predominantly clayey or sandy soils are present and may be continuous throughout the investigation area. A layer of variable thickness consisting predominately of clay, silty clay, and clayey silt appears to be present between 20 to 30 ft bgs throughout the Site.

Samples of groundwater were collected at nine boring locations using a direct-push sampling method in conjunction with the CPT investigation. The results of groundwater sample analyses appear to be generally consistent with sampling from groundwater monitoring wells. Data from the direct-push sampling of groundwater are summarized on Table 4 and Figure 6.

Two new groundwater monitoring wells were installed on the Reliable Steel property. Well MW-4 was installed at a location that appears to be downgradient of the area of highest concentrations of TCE detected in groundwater (i.e. southeast of MW-1) beneath the Webb property. Well MW-5 was installed east of well MW-1. Both wells were constructed similarly to previously installed wells MW-1, MW-2, and MW-3 and are screened across the groundwater table.

Monthly gauging of the groundwater table elevation was performed on 8 October, 5 November, and 21 December 1998. Quarterly groundwater sampling was performed on 5 November 1998. The direction of groundwater flow was estimated to range from toward the south to southeast under the Webb property. The direction of groundwater flow under the Reliable Steel property appeared to vary during the monitoring period. The groundwater elevation data from 5 November 1998 suggest that groundwater flow is toward the southwest under the Reliable Steel property. However, the 21 December 1998 data indicate that groundwater flow is toward the south, which is consistent with the data collected at the Webb property.

Analytical results for groundwater samples collected during the direct-push sampling investigation and quarterly monitoring indicate that several VOCs are present in groundwater beneath the Site. The results of these analyses are generally consistent with prior sampling and analysis of groundwater from the Site.

Concentrations of TCE in groundwater are significantly higher than concentrations of the other detected VOCs. The highest concentrations of TCE in groundwater were detected in samples collected near the building on the Webb property (MW-1 at 28,000 ug/L, CPT-6 at 35,000 ug/L and CPT-7 at 27,000 ug/L). As indicated by the data shown on Figure 7, concentrations of TCE in groundwater appear to decrease significantly to the south and southeast, downgradient of the Webb property. TCE was detected at 6.7 ug/L in a groundwater sample collected from well MW-4 and was not detected in groundwater samples collected at approximately 55 and 95 ft bgs at CPT-1. Concentrations of TCE in groundwater to the east (MW-5 at 5,000 ug/L), west (MW-3 at 2,300 ug/L), and north (MW-2 at 3,200 ug/L) of the Webb property building are approximately an order of magnitude lower than the highest concentrations of TCE in groundwater at the Site.

Other VOCs detected in samples of groundwater collected at the Site include PCE, c-1,2-DCE, t-1,2-DCE, 1,1-DCA, 1,2 DCA, 1,1-DCE, acetone, benzene, xylenes, toluene, and MEK. The detected concentrations of these VOCs are significantly less than the concentration of TCE in groundwater at the Site.

A general mineral analysis was performed on two groundwater samples from MW-2 and MW-4. Total dissolved solids concentrations were 2,600 and 3,600 mg/kg, respectively, for these samples. Previous analysis of groundwater samples from the Site measured TDS concentrations ranging from 1,100 mg/L (well MW-2) to 6,300 mg/L (former Dial well MW-5). State Water Resources Control Board Policy (State Board Resolution No. 88-63), adopted by the RWQCB Basin Plan dated 13 June 1994, indicates that groundwater with a TDS concentration greater than 3,000 mg/L is not suitable as a source of drinking water.

6. REFERENCES

California Department of Water Resources, 1961. *Bulletin No. 104: Planned Utilization of the Groundwater Basins of the Coastal Plain of Los Angeles County, Appendix A, Groundwater Geology.* June 1961. (DWR, 1961).

Erler & Kalinowski, Inc., 18 February 1998. *Phase II Soil Investigation Report for the Jervis B. Webb Company Property at 5030 Firestone Boulevard in South Gate, California.*

Erler & Kalinowski, Inc., 30 June 1998. *Phase II Groundwater Investigation Report for the Jervis B. Webb Company Property at 5030 Firestone Boulevard in South Gate, California.*

U.S. Geological Survey, 1964, photo-revised 1981. *South Gate, California Quadrangle, 7.5 Minute Series.*

TABLES

TABLE 1
Well Construction Details
Additional Groundwater Investigation and
Quarterly Monitoring Report for October to December 1998
Jervis B. Webb Company, 5030 Firestone Boulevard, South Gate, California

Well ID	Installation Date	Boring Depth (ft bgs)	Boring Diameter (inches)	Casing Diameter (inches)	Perforated Interval (ft bgs)	Casing Material	Screen Material	Perforation Size (inches)	Filter Pack Material	Surface Completion
MW-1	2/25/98	73	10-1/4	4	40 - 70	PVC	PVC	0.010	#1C Lonestar	12" EMCO
MW-2	2/25/98	73	10-1/4	4	40 - 70	PVC	PVC	0.010	#1C Lonestar	12" EMCO
MW-3	2/25/98	73	10-1/4	4	40 - 70	PVC	PVC	0.010	#1C Lonestar	12" EMCO
MW-4	10/28/98	71	10-1/4	4	40 - 70	PVC	PVC	0.010	#1C Lonestar	12" EMCO
MW-5	10/28/98	71	10-1/4	4	40 - 70	PVC	PVC	0.010	#1C Lonestar	12" EMCO

NOTES: Abbreviations: ft bgs = feet beneath the ground surface
PVC = polyvinyl chloride

TABLE 2
Analytical Results for Samples of Soil

Additional Groundwater Investigation and
Quarterly Monitoring Report for October to December 1998
Jervis B. Webb Company, 5030 Firestone Boulevard, South Gate, California

Boring Number	Sample Number	Depth (ft. bgs)	Concentration PCE (ug/kg)	Concentration TCE (ug/kg)
MW-5	MW-5-21	21	<2.5	**22**
MW-5	MW-5-31	31	<2.5	**11**
MW-5	MW-5-41	41	<50	**550**

NOTES: Abbreviations:

PCE = tetrachloroethene
TCE = trichloroethene
ft bgs = feet beneath ground surface
ug/kg = micrograms per kilogram

1. Chemical analyses were performed by Orange Coast Analytical, Inc. using EPA Method 8010.
2. Samples from boring MW-5 collected on 28 November 1998.
3. Sample depth is indicated in the sample name. Depth is indicated by the last number separate a hyphen in each sample description. (i.e. sample MW-5-21 collected at 21 ft bgs.

TABLE 3

Groundwater Elevations in Monitoring Wells

Additional Groundwater Investigation and
Quarterly Monitoring Report for October to December 1998
Jervis B. Webb Company, 5030 Firestone Boulevard, South Gate, California

Well ID	Date	Elevation of Top-of-Casing (ft msl)	Depth to Water (ft bgs)	Elevation of Water Surface (ft bgs)	Comments
MW-1	2/27/98	106.09	44.79	61.30	
	3/2/98	106.09	44.82	61.27	
	3/4/98	106.09	44.58	61.51	
	4/8/98	106.09	44.57	61.52	
	5/20/98	106.09	43.99	62.10	
	10/8/98	106.09	43.38	62.71	
	11/5/98	106.09	43.14	62.95	
	12/21/98	106.09	43.37	62.72	
MW-2	2/27/98	106.65	44.02	62.63	
	3/2/98	106.65	44.06	62.59	
	3/4/98	106.65	44.13	62.52	
	4/8/98	106.65	NR	--	Truck parked on well.
	5/20/98	106.65	43.51	63.14	
	10/8/98	106.65	42.84	63.81	
	11/5/98	106.65	42.64	64.01	
	12/21/98	106.65	42.69	63.96	
MW-3	2/27/98	105.87	44.55	61.32	
	3/2/98	105.87	44.56	61.31	
	3/4/98	105.87	44.40	61.47	
	4/8/98	105.87	44.39	61.48	
	5/20/98	105.87	43.80	62.07	
	10/8/98	105.87	43.26	62.61	
	11/5/98	105.87	43.60	62.27	
	12/21/98	105.87	43.33	62.54	
MW-4	11/3/98	104.72	42.77	61.95	
	11/5/98	104.72	42.64	62.08	
	12/21/98	104.72	42.93	61.79	
MW-5	11/3/98	106.13	43.32	62.81	
	11/5/98	106.13	43.30	62.83	
	12/21/98	106.13	43.58	62.55	

NOTES: Abbreviations: ft msl = feet above mean sea level
ft bgs = feet beneath ground surface

1. Monitoring well northing and easting coordinates and top-of-casing elevations for wells MW-1, MW-2, and MW-3 were surveyed on 6 March 1998 by Rattray & Associates, Inc. Coordinates and elevations for wells MW-4 and MW-5 were surveyed by Rattray & Associates, Inc on 21 December 1998.

TABLE 5
Analytical Results for Monitoring Well Groundwater Samples

Additional Groundwater Investigation and Quarterly Monitoring Report for October to December 1998

Jervis B. Webb Company, 5030 Firestone Boulevard, South Gate, California

Well ID	Sample Number	Sample Date	Analyte Concentration										
			Benzene (ug/L)	Toluene (ug/L)	Xylenes (ug/L)	1,1-DCA (ug/L)	1,2-DCA (ug/L)	1,1-DCE (ug/L)	c-1,2-DCE (ug/L)	t-1,2-DCE (ug/L)	PCE (ug/L)	TCE (ug/L)	TDS (mg/L)
MW-1	MW-1-0304	3/4/98	<0.5	<0.5	<0.5	<0.5	<0.5	220	130	<0.5	140	24,000	--
	MW-1-0304DUP	3/4/98	<0.5	<0.5	<0.5	<0.5	<0.5	210	150	<0.5	160	25,000	--
	MW-1-0520	5/20/98	<125	<125	<125	<125	<125	160	130	<125	<125	24,000	1,500
	MW-1	11/5/98	<125	<125	<125	<125	<125	140	160	<125	170	28,000	--
MW-2	MW-2-0304	3/4/98	<0.5	<0.5	<0.5	13	<0.5	34	65	<0.5	<0.5	2,700	--
	MW-2-0520	5/20/98	<10	<10	<10	14	<0.5	38	68	<10	<10	3,000	2,500
	MW-2	11/5/98	<10	<10	<10	13	<10	36	68	<10	<10	3,200	2,600
MW-3	MW-3-0304	3/4/98	<0.5	13	<0.5	14	<0.5	82	200	<0.5	<0.5	2,800	--
	MW-3-0520	5/20/98	<10	<10	<10	13	<0.5	58	230	15	<10	2,800	1,100
	MW-3	11/5/98	<10	<10	<10	11	<10	66	240	18	<10	2,300	--
MW-4	MW-4	11/5/98	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.67	<0.5	<0.5	6.7	3,600
MW-5	MW-5	11/5/98	<25	<25	<25	<25	<25	42	380	30	<25	5,000	--
	MW-5-DUP	11/5/98	<25	<25	<25	<25	<25	40	360	29	<25	4,800	--
California MCL			1	150	1750	5	0.5	6	6	10	5	5	

NOTES: Abbreviations:

xylenes = total xylene isomers
1,1-DCA = 1,1-dichloroethane
1,1-DCE = 1,1-dichloroethene
1,2-DCA = 1,2-dichloroethane
c-1,2-DCE = cis-1,2-dichloroethene
t-1,2-DCE = trans-1,2-dichloroethene
VOCs = volatile organic compounds

PCE = tetrachloroethene
TCE = trichloroethene
1,1,1-TCA = 1,1,1-trichloroethane
TDS = total dissolved solids
ug/L = micrograms per liter
mg/L = milligrams per liter
-- indicates not analyzed

1. Analyses performed by Orange Coast Analytical, Inc. using EPA Method 8260 for VOCs and EPA Method 160.1 for TDS.
2. California maximum contaminant levels ("MCLs") are as reported in the Drinking Water Standards and Health Advisories Table by U.S. EPA Region IX, dated June 1998.

TABLE 4

Analytical Results for Direct-Push Groundwater Samples

Additional Groundwater Investigation and Quarterly Monitoring Report for October to December 1998

Jervis B. Webb Company, 5030 Firestone Boulevard, South Gate, California

PIPP Location	Sample Date	Depth (ft bgs)	Volatile Organic Compounds - EPA Method 8260 (ug/L)											
			Acetone	MEK	Benzene	Toluene	Xylenes	1,1-DCA	1,2-DCA	1,1-DCE	c-1,2-DCE	t-1,2-DCE	PCE	TCE
CPT-1	10/1/98	55	**170**	**4.6**	**1.6**	<0.5	**1.6**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CPT-1	10/1/98	95	**8.1**	<1	<0.5	<0.5	<0.5	<0.5	**5.3**	<0.5	<0.5	<0.5	<0.5	<0.5
CPT-2	10/1/98	55	**300**	**3.5**	<1	**1.1**	<1	<1	<1	<1	<1	<1	<1	**1.6**
CPT-3	10/1/98	55	**170**	**2.7**	**0.58**	**0.55**	**0.66**	<0.5	<0.5	<0.5	**2.6**	<0.5	<0.5	**6.3**
CPT-4A	10/1/98	55	**95**	**2.2**	<1	**1.1**	**1.2**	**1.2**	<1	**4.1**	**11**	<1	<1	**220**
CPT-4B	10/1/98	55	**80**	**8.4**	<1	<1	<1	**1.1**	<1	**3.4**	**10**	<1	<1	**200**
CPT-5	10/1/98	55	**480**	<25	<13	<13	<13	<13	<13	<13	**110**	<13	<13	**3,800**
CPT-6	10/2/98	55	<400	<200	<100	<100	<100	**240**	<100	<100	**130**	<100	**110**	**35,000**
CPT-7	10/2/98	55	<500	<250	<125	<125	<125	**160**	<125	<125	**190**	<125	<125	**27,000**
CPT-8	10/2/98	55	**16**	<1	<0.5	<0.5	<0.5	**1.4**	<0.5	**6.7**	**11**	**1.3**	<0.5	**140**
CPT-9	10/2/98	55	**490**	**7.7**	<1	<1	<1	<1	<1	<1	<1	<1	<1	**9.1**
California MCL			none	none	1	150	1,750	5	0.5	6	6	10	5	5

NOTES: Abbreviations:

PIPP = Push-In Plastic Piezometer
ft bgs = feet below ground surface
ug/L = micrograms per liter
MEK = Methyl ethyl ketone (2-butanone)
Xylenes = Total xylenes
1,1-DCA = 1,1-Dichloroethane
1,2-DCA = 1,2-Dichloroethane
1,1-DCE = 1,1-Dichloroethene
c-1,2-DCE = cis-1,2-Dichloroethene
t-1,2-DCE = trans-1,2-Dichloroethene
PCE = Tetrachloroethene
TCE = Trichloroethene

1. Sample CPT-4B is a duplicate of sample CPT-4A.
2. Chemical analyses were performed by Orange Coast Analytical, Inc. in Tustin, California
3. California maximum contaminant levels ("MCLs") are as reported in the Drinking Water Standards and Health Advisories Table by U.S. EPA Region IX, dated June 1998. "none" indicates that no MCL (California or federal) has been established.

TABLE 6

Analytical Results for General Minerals in Groundwater Samples

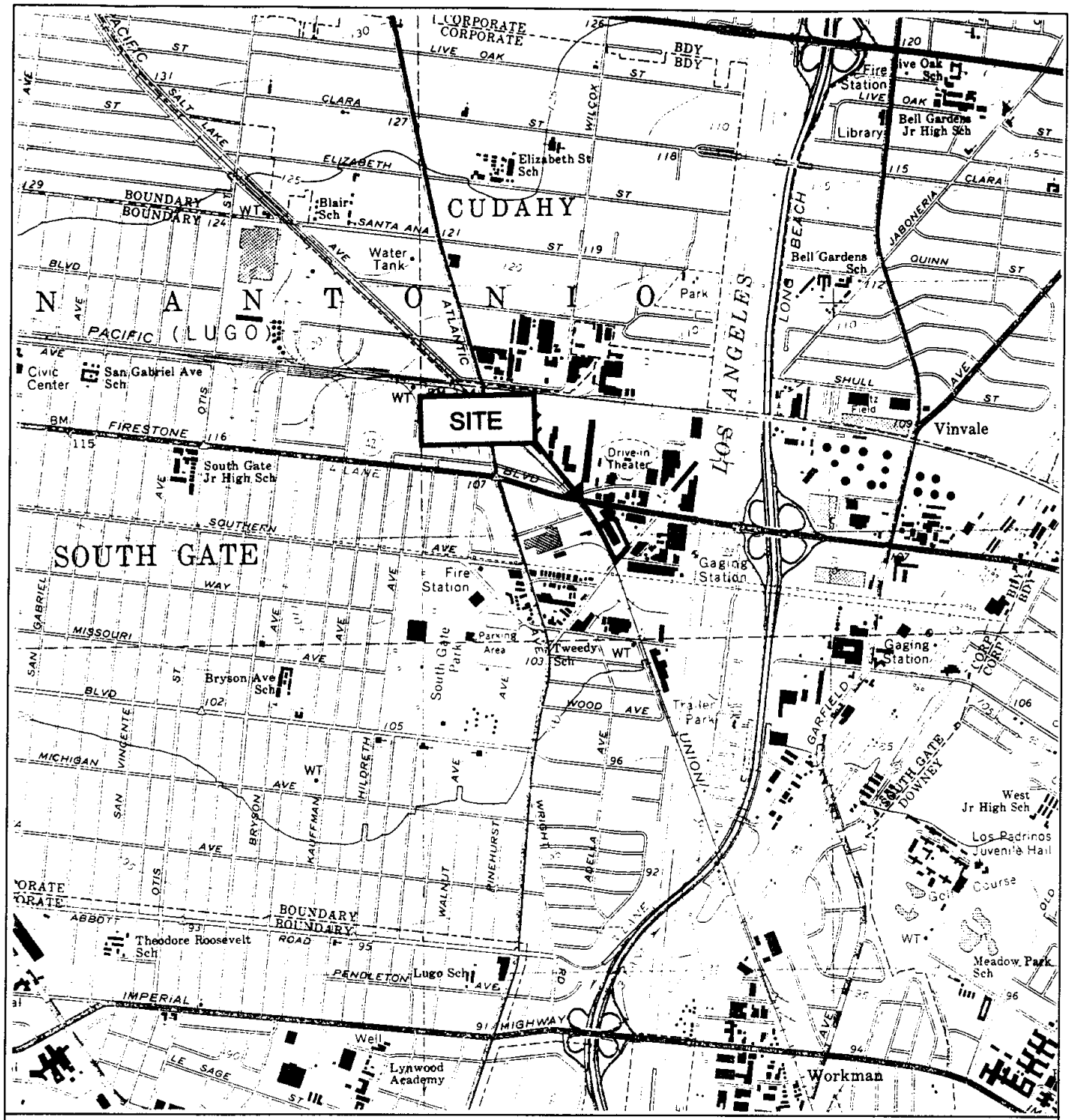
Additional Groundwater Investigation and
Quarterly Monitoring Report for October to December 1998
Jervis B. Webb Company, 5030 Firestone Boulevard, South Gate, California

Analyte	EPA Method	Well ID MW-2 (mg/L)	MW-4 (mg/L)	
Alkalinity	310.1	720	920	
Calcium	200.7	130	370	
Chloride	325.3	51	86	
Copper	200.7	<0.01	<0.01	
Fluoride	340.1	<0.1	<0.1	
Iron	200.7	0.47	0.66	
Magnesium	200.7	94	190	
Manganese	200.7	0.93	108	
MBAS(Surfactants)	425.1	<0.05	<0.05	
Nitrate	353.3	<0.01	<0.01	
pH	150.1	7.3	7.1	
Phosphate	365.2	0.48	0.18	
Potassium	258.1	8.7	19	
Sodium	273.1	640	480	
Specific Conductance	120.1	4200	5700	umhos/cm
Sulfate	375.4	1300	1850	
Total Hardness	130.2	710	1800	
Zinc	200.7	<0.01	<0.01	

NOTES: mg/L = milligrams per liter

1. Samples were collected on 5 November 1998 and analyzed by Orange Coast Analytical, Inc. of Tustin, California.

FIGURES

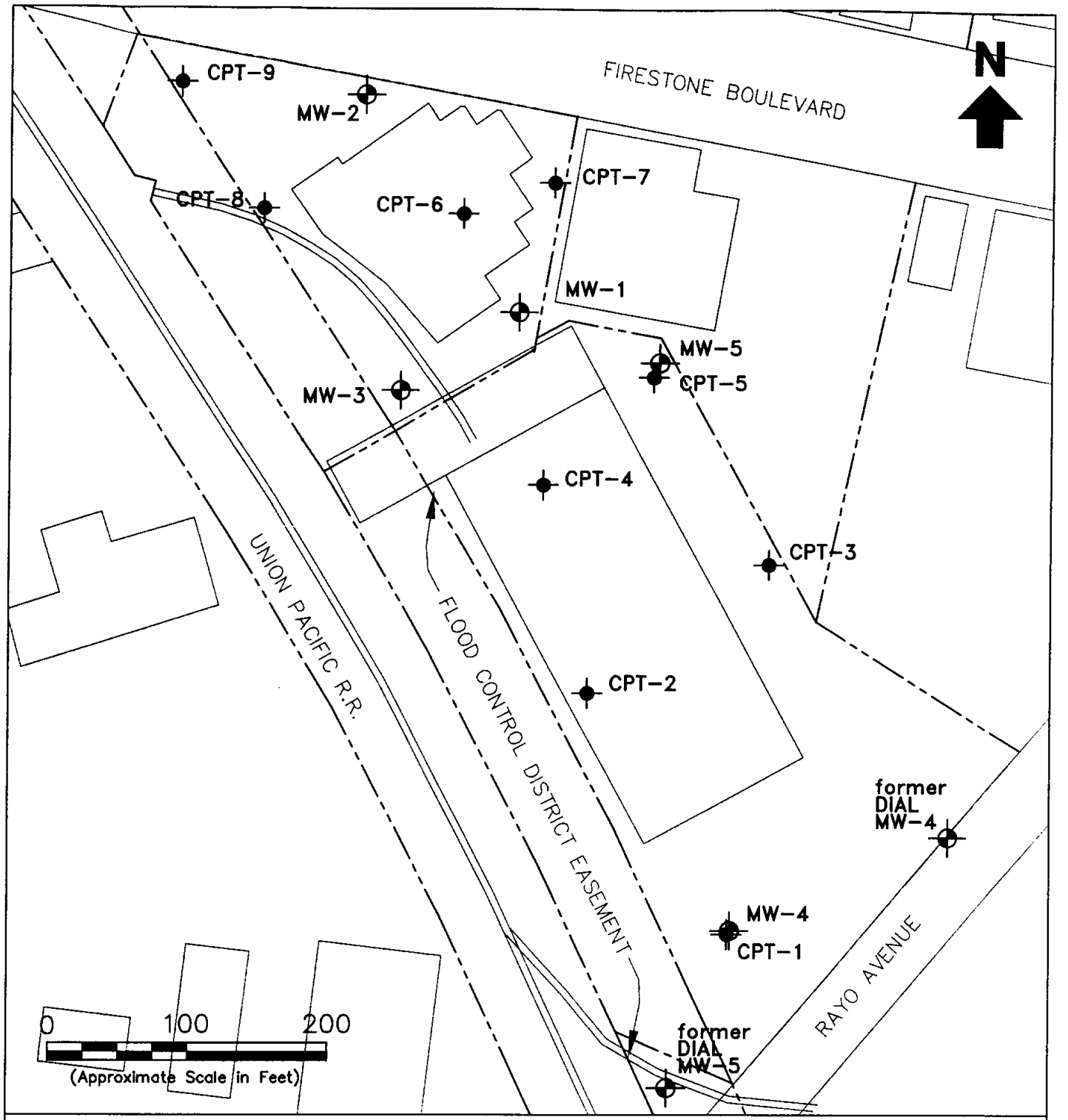


Erler & Kalinowski, Inc.

Site Location Map

Jervis B. Webb Company
South Gate, California
January 1999
EKI 961025.02
Figure 1

Source: U.S.G.S 7.5 Minute Series "South Gate" Quadrangle, 1964, photorevised 1981.



LEGEND

- PIPP Groundwater Sample Location
- Groundwater Monitoring Well
- Property Line/Boundary

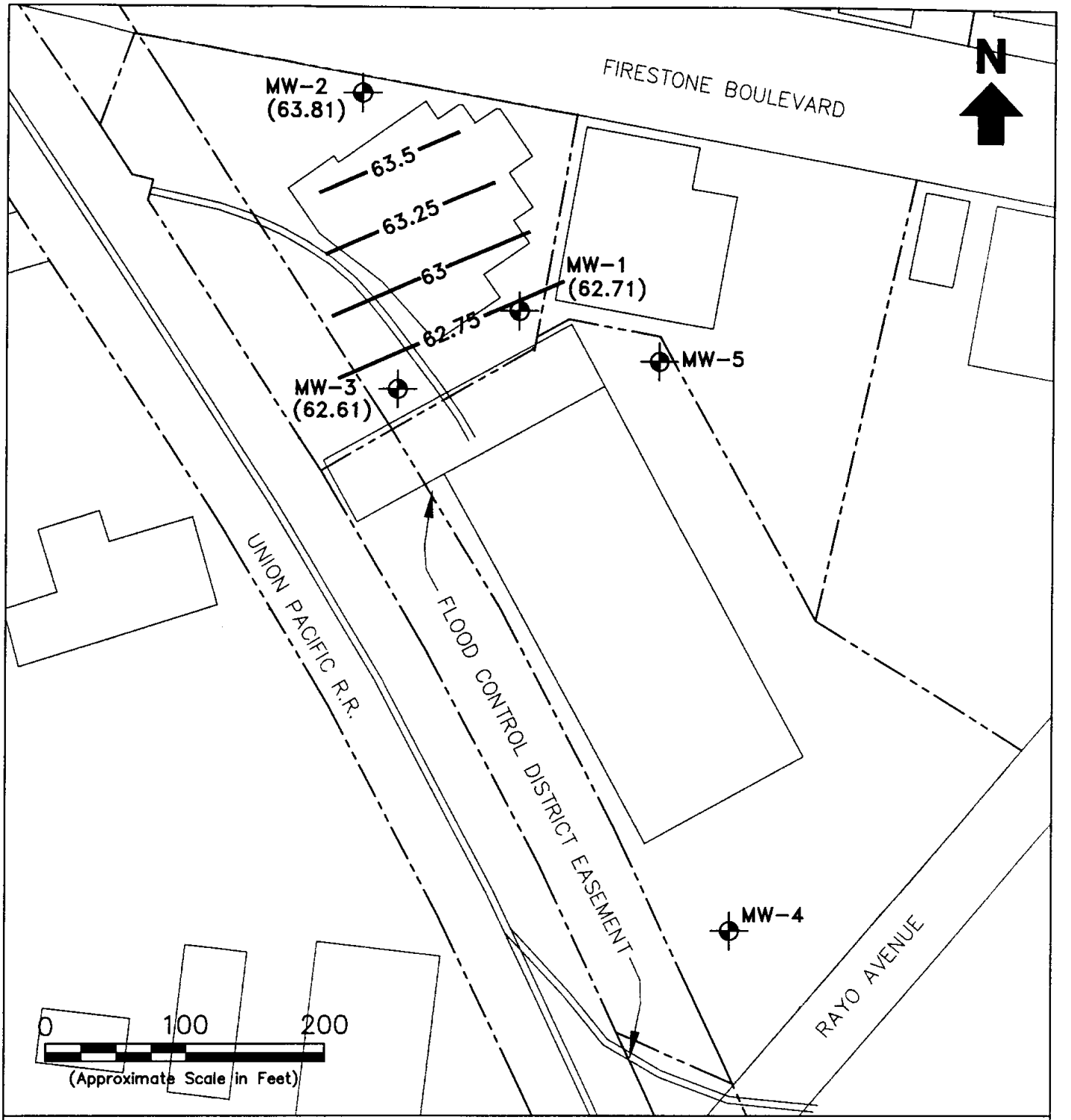
Erler & Kalinowski, Inc.

CPT Groundwater Sampling and Monitoring Well Locations

Jervis B. Webb Company
South Gate, California
January 1999
EKI 961025.02
Figure 2

Notes:

1. All locations are approximate.



LEGEND

Contour Representing the Elevation of the Groundwater Table in Feet Above Mean Sea Level (msl)

MW-3 (62.61) Groundwater Monitoring Well with Groundwater Elevation (msl)

Property Line/Boundary

Notes:

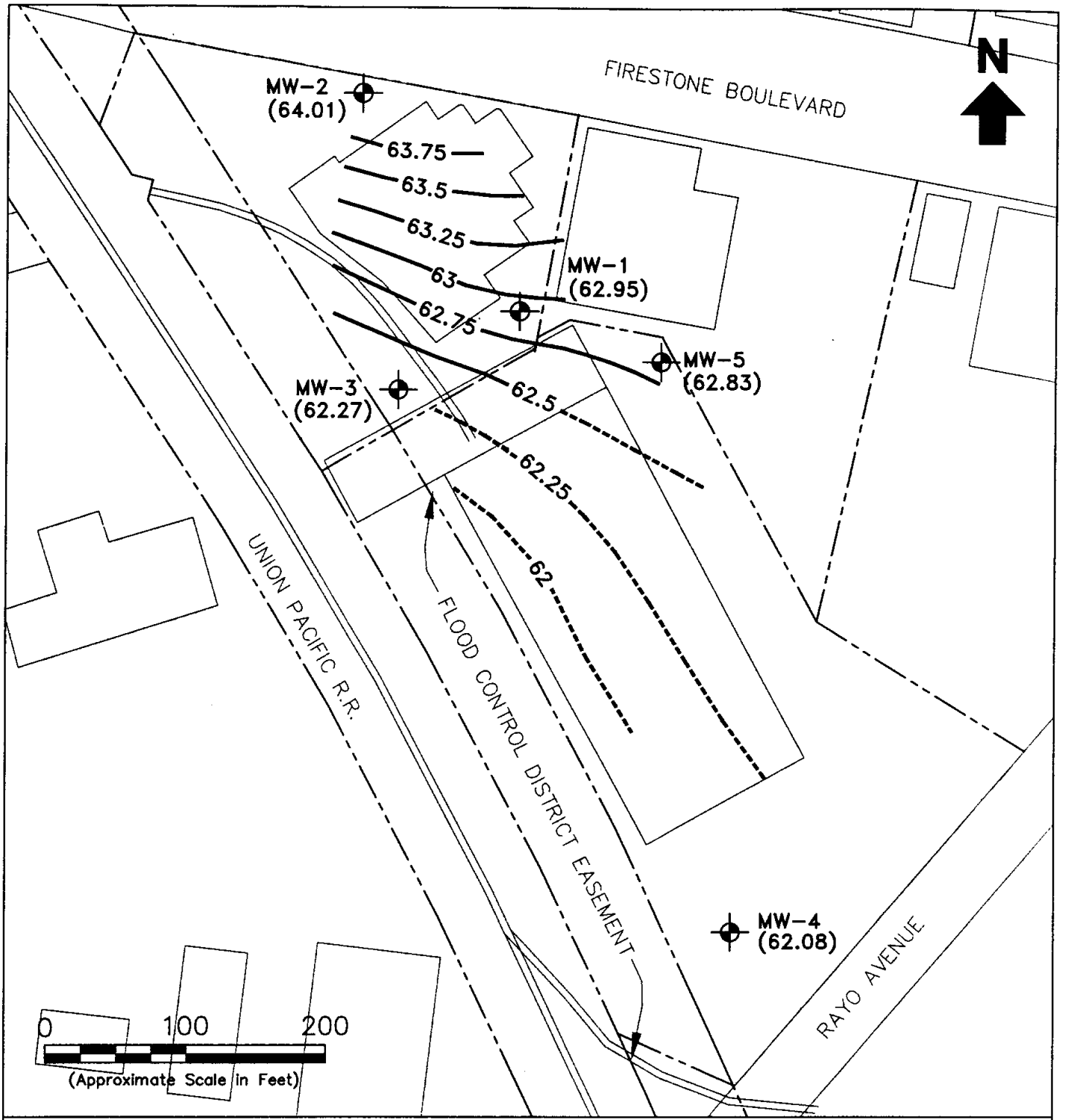
1. All locations are approximate.
2. Wells MW-4 and MW-5 had not yet been installed on 8 October 1998.

Erler & Kalinowski, Inc.

Elevation of the Groundwater Table on 8 October 1998

Jervis B. Webb Company
South Gate, California
January 1999
EKI 961025.02

Figure 3



LEGEND

Contour Representing the Elevation of the Groundwater Table in Feet Above Mean Sea Level (msl)

MW-3 (62.61) Groundwater Monitoring Well with Groundwater Elevation (msl)

Property Line/Boundary

Notes:

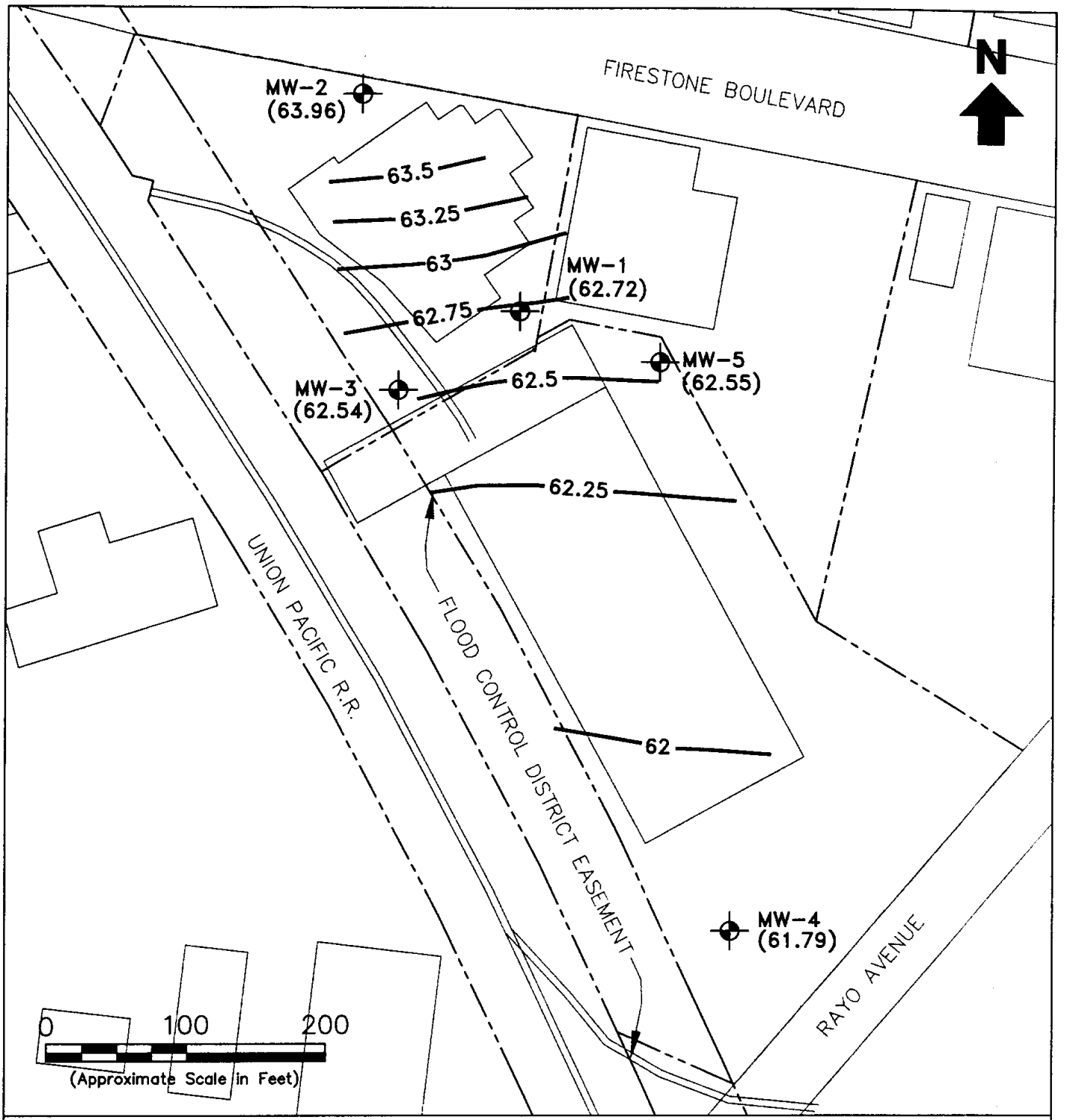
1. All locations are approximate.

Erler & Kalinowski, Inc.

Elevation of the Groundwater Table on 5 November 1998

Jervis B. Webb Company
South Gate, California
January 1999
EKI 961025.02

Figure 4



LEGEND

Contour Representing the Elevation of the Groundwater Table in Feet Above Mean Sea Level (msl)

MW-3 (62.61) Groundwater Monitoring Well with Groundwater Elevation (msl)

Property Line/Boundary

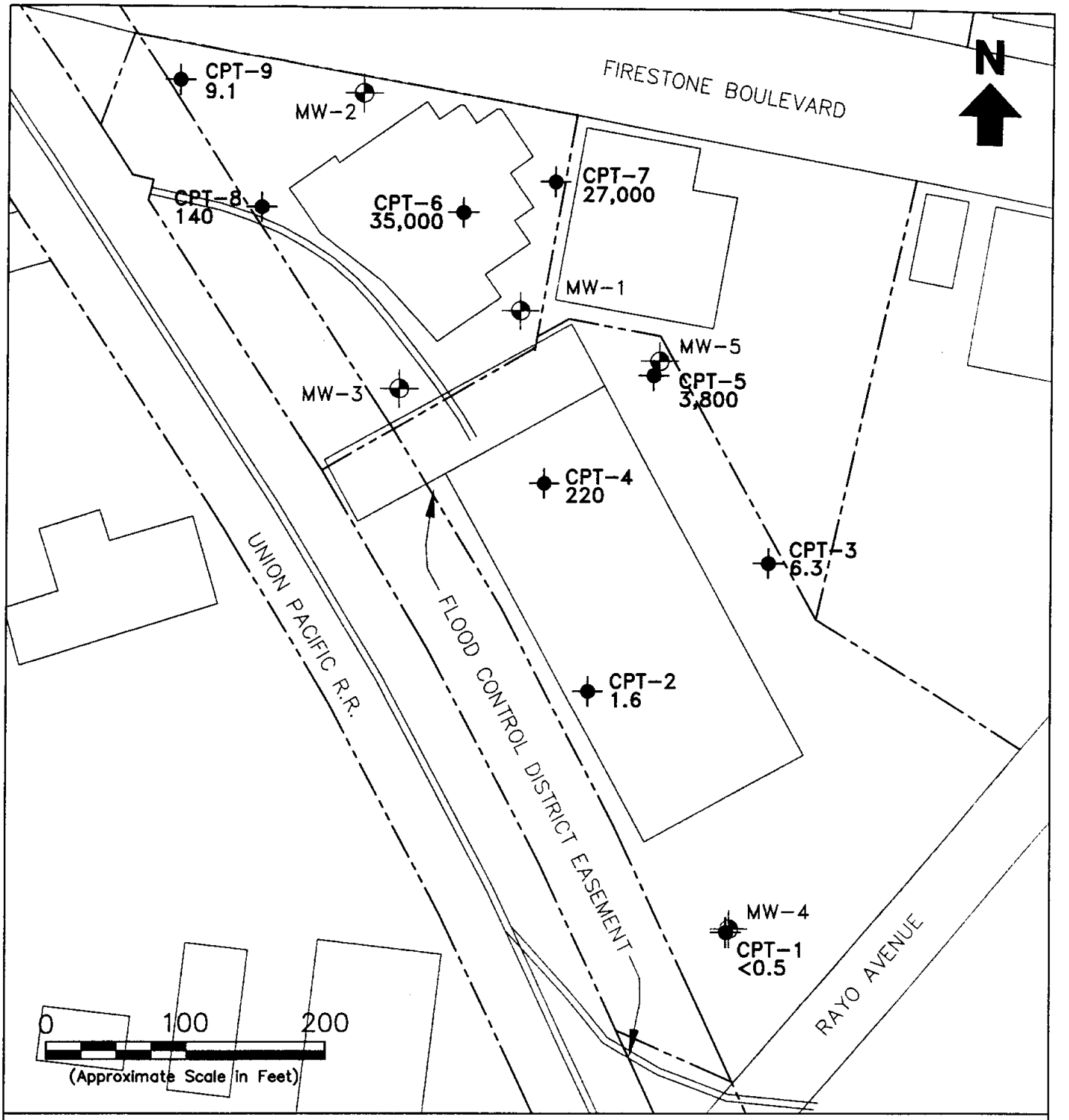
Notes:

1. All locations are approximate.

Erler & Kalinowski, Inc.

Elevation of the Groundwater Table on 21 December 1998

Jervis B. Webb Company
South Gate, California
January 1999
EKI 961025.02
Figure 5



LEGEND

- PIPP Groundwater Sample Location
- Groundwater Monitoring Well
- Property Line/Boundary

Erler & Kalinowski, Inc.

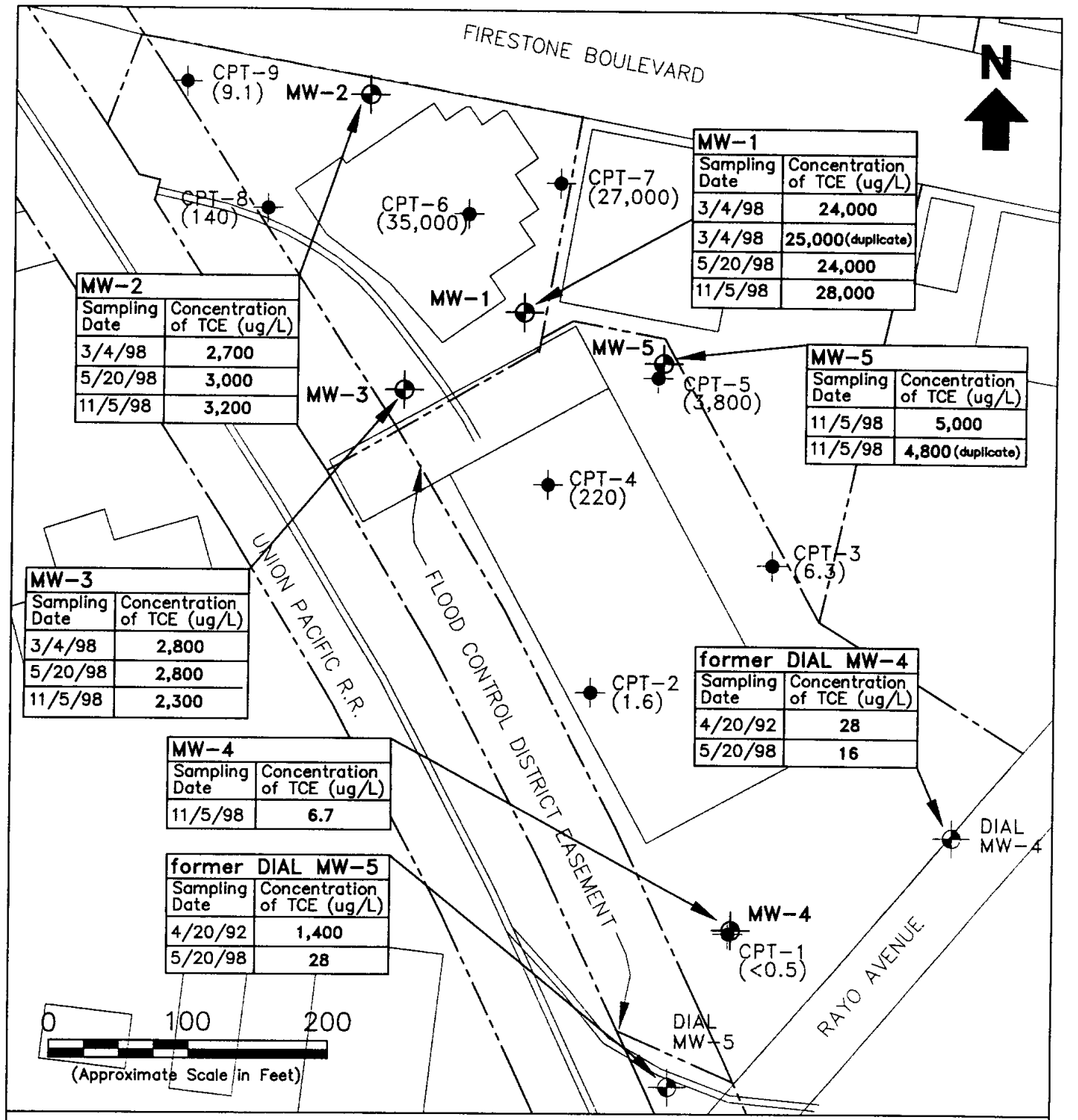
Concentrations of Trichloroethene Detected in PIPP Groundwater Samples

Jervis B. Webb Company
South Gate, California
January 1999
EKI 961025.02

Figure 6

Notes:

1. All locations are approximate.
2. Concentrations shown in units of micrograms per liter.



MW-1	
Sampling Date	Concentration of TCE (ug/L)
3/4/98	24,000
3/4/98	25,000 (duplicate)
5/20/98	24,000
11/5/98	28,000

MW-2	
Sampling Date	Concentration of TCE (ug/L)
3/4/98	2,700
5/20/98	3,000
11/5/98	3,200

MW-5	
Sampling Date	Concentration of TCE (ug/L)
11/5/98	5,000
11/5/98	4,800 (duplicate)

MW-3	
Sampling Date	Concentration of TCE (ug/L)
3/4/98	2,800
5/20/98	2,800
11/5/98	2,300

former DIAL MW-4	
Sampling Date	Concentration of TCE (ug/L)
4/20/92	28
5/20/98	16

MW-4	
Sampling Date	Concentration of TCE (ug/L)
11/5/98	6.7

former DIAL MW-5	
Sampling Date	Concentration of TCE (ug/L)
4/20/92	1,400
5/20/98	28

LEGEND

- Groundwater Monitoring Well
- CPT-4 (220) PIPP Groundwater Sample Location with TCE Concentration from PIPP Sample
- Property Line/Boundary

Notes:

1. All locations are approximate.
2. Groundwater sampling at former Dial Corporation wells MW-4 and MW-5 performed by Emcon on 20 April 1992 and Erler & Kalinowski on 20 May 1998.
3. PIPP samples of groundwater collected on 1 and 2 October 1998.
   TCE = trichloroethene ug/L = micrograms per liter

Erler & Kalinowski, Inc.

Concentrations of Trichloroethene Detected in Monitoring Well Groundwater Samples

Jervis B. Webb Company
South Gate, California
January 1999
EKI 961025.02

Figure 7

APPENDICES

APPENDIX A

Holguin, Fahan & Associates CPT Test Data and Interpretations

HOLGUIN, FAHAN & ASSOCIATES, INC.
CONE PENETROMETER TESTING AND DIRECT-PUSH SAMPLING GROUP
16570 Aston Street • Irvine, California 92606 • (949) 442-6665 • FAX (949) 724-0446

October 16, 1998

Mr. Rob Hesse
Erler & Kalinowski, Inc.
2951 28th Street
Suite 1020
Santa Monica, CA 90405

PROJECT NAME: CPT and GW Sampling at the Webb Site
PROJECT NO.: 961025.02

Dear Mr. Hesse:

Enclosed please find copies of the cone penetrometer testing (CPT) data for the above referenced project along with a copy of the corresponding invoice.

The cone penetrometer testing conducted for this project consisted of pushing an instrumented cone-tipped probe into the ground while simultaneously recording the resistance to penetration at the cone tip and along the friction sleeve.

The cone penetrometer testing described in this report was conducted in general accordance with the current ASTM specifications (ASTM D5778-95 and D3441-94) using an electronic cone penetrometer.

The CPT equipment operated by Holguin, Fahan & Associates, Inc. (HFA) consists of a cone assembly mounted at the end of a series of hollow sounding rods. A set of hydraulic rams is used to continuously push the cone and rods into the soil at a rate of 20-mm per second (approximately four feet per minute) while the cone tip resistance and sleeve friction resistance are recorded every 50-mm (approximately two inches) and stored in digital form. A specially designed all wheel drive 23-ton truck provides the required reaction weight for pushing the cone assembly and is also used to transport and house the test equipment.

The cone penetrometer assembly used for this project consists of a conical tip and a cylindrical friction sleeve. The conical tip has a 60° apex angle and a diameter of 35.6-mm (1.40-inch) resulting in a projected cross-sectional area of 10 cm^2 (1.5 square inches). The cylindrical friction sleeve is 133-mm (5.25-inch) in length and has an outside diameter of 35.8-mm (1.41-inch), resulting in a surface area of 150 cm^2 (23 square inches).

The interior of the cone penetrometer is instrumented with strain gauges that allow simultaneous measurement of cone tip and friction sleeve resistance during penetration. Continuous electric signals from the strain gauges are transmitted by a shielded cable in the sounding rods to the PC-based data acquisition hardware in the CPT truck. The sounding log is also displayed on a monitor.

The CPT data processing is performed using the truck mounted computer based data acquisition and presentation system. The computer generated graphical logs include cone resistance, friction resistance, friction ratio, and pore pressure ratio versus depth at a user selectable scale.

Soil behavior type interpretations are based on the following reference: Robertson, P.K. and Campanella, R.C., 1989, "Guidelines for Geotechnical Design using the Cone Penetrometer Test and CPT with Pore Pressure Measurement." Soil Mechanics series No. 120, Civil Engineering Department, University of British Columbia, Vancouver, B.C., V6T 1Z4, September 1989.

Interpretations and plotting has been done using HFA's proprietary data interpretation and presentation software. It is important to note that the data is not averaged. All interpretations are point interpretations at the corresponding depth listed.

It is also important to note that the soil behavior type correlations are based on a combination of theory, field research, research performed under laboratory conditions, and literature review. The information presented in the tabulated and/or graphical logs should, therefore, be viewed as a guideline rather than as precise measurements.

Some care is recommended when using the soil behavior type interpretations. If a tabulation depth happens to fall on a soil layer interface, or a seam of soil differing from the rest of the layer, the tabulated data can be misleading. The solution to this problem is the proper use of the graphical CPT logs. The tip and sleeve penetration resistance logs are the primary source of profile description; the soil behavior type logs are supplemental. The graphical logs of tip and sleeve resistance should be examined and layer boundaries delineated in accordance with the project requirements. The soil behavior type interpretations are only representative of the response of the soil to the large shear deformations imposed during cone penetration. This is not necessarily a prediction of grain size distribution. However, it has been found that the interpreted soil behavior types generally agree well with the soil types defined in accordance with the grain size distribution methods such as used in the Unified Soil Classification System.

Limitations

Holguin, Fahan & Associates, Inc. (HFA) presents the attached data in accordance with ASTM Standards D5778-95 and D3441-94 and generally accepted cone penetrometer testing practices and standards. The attached data further relates only to the specific project and location discussed in the data. Judgement may be required to verify the CPT soil behavior interpretations.

The "Client" may distribute this data or excerpts therefrom provided the following statement is prominently displayed and included with the distribution:

"Neither CLIENT nor HFA make any guarantee or warranty, express or implied, regarding this data. THE USE OF THIS INFORMATION SHALL BE AT THE USER'S SOLE RISK REGARDLESS OF ANY FAULT OR NEGLIGENCE OF THE CLIENT OR HFA."

Please feel free to call if you have any questions.

Respectfully submitted,

Girish Agrawal

Girish Agrawal, Ph.D, P.E.
Operations Manager & Geotechnical Services Manager
Holguin, Fahan & Associates, Inc.

\Enclosures

CPT INTERPRETATIONS

SOUNDING : CPT-1
PROJECT : EKI/WEBB
DATE/TIME: 10-01-98 06:49

PROJECT No.: 98-E623
CONE/RIG : 473/R#3 KC/MR

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
.150	.49	.00	.00		0	0			.0
.300	.98	.00	.00		0	0			.0
.450	1.48	56.21	2.99	SANDY SILT to CLAYEY SILT	22	36		3.7	
.600	1.97	46.72	2.03	SANDY SILT to CLAYEY SILT	19	30		3.1	
.750	2.46	33.93	3.27	CLAYEY SILT to SILTY CLAY	17	27		2.3	
.900	2.95	18.21	3.79	CLAY to SILTY CLAY	12	19		1.2	
1.050	3.44	32.87	2.56	SANDY SILT to CLAYEY SILT	13	21		2.2	
1.200	3.94	37.33	3.16	CLAYEY SILT to SILTY CLAY	19	30		2.5	
1.350	4.43	31.31	2.97	CLAYEY SILT to SILTY CLAY	16	25		2.1	
1.500	4.92	27.72	2.67	CLAYEY SILT to SILTY CLAY	14	22		1.8	
1.650	5.41	28.72	2.54	CLAYEY SILT to SILTY CLAY	14	23		1.9	
1.800	5.91	33.21	2.83	CLAYEY SILT to SILTY CLAY	17	27		2.2	
1.950	6.40	39.64	2.52	SANDY SILT to CLAYEY SILT	16	25		2.6	
2.100	6.89	59.55	2.22	SANDY SILT to CLAYEY SILT	24	38		3.9	
2.250	7.38	80.73	2.06	SILTY SAND to SANDY SILT	27	41	70		43.5
2.400	7.87	98.02	1.80	SILTY SAND to SANDY SILT	33	49	76		44.0
2.550	8.37	66.81	2.16	SILTY SAND to SANDY SILT	22	32	65		42.0
2.700	8.86	40.26	2.68	SANDY SILT to CLAYEY SILT	16	23		2.7	
2.850	9.35	50.82	2.54	SANDY SILT to CLAYEY SILT	20	28		3.4	
3.000	9.84	16.19	2.04	CLAYEY SILT to SILTY CLAY	8	11		1.2	
3.150	10.33	17.04	1.94	CLAYEY SILT to SILTY CLAY	9	11		1.3	
3.300	10.83	35.37	2.52	SANDY SILT to CLAYEY SILT	14	18		2.3	
3.450	11.32	59.00	3.15	SANDY SILT to CLAYEY SILT	24	29		3.4	
3.600	11.81	29.68	3.54	CLAYEY SILT to SILTY CLAY	15	18		1.9	
3.750	12.30	101.53	2.35	SILTY SAND to SANDY SILT	34	40	72		42.0
3.900	12.80	102.82	2.77	SANDY SILT to CLAYEY SILT	41	48		6.0	
4.050	13.29	24.28	4.41	CLAY to SILTY CLAY	16	19		1.6	
4.200	13.78	9.54	2.31	CLAY to SILTY CLAY	6	7		.7	
4.350	14.27	24.92	2.77	CLAYEY SILT to SILTY CLAY	12	14		1.6	
4.500	14.76	31.38	3.57	CLAYEY SILT to SILTY CLAY	16	17		2.0	
4.650	15.26	42.53	2.87	SANDY SILT to CLAYEY SILT	17	18		2.8	
4.800	15.75	38.86	3.73	CLAYEY SILT to SILTY CLAY	19	20		2.2	
4.950	16.24	53.39	2.72	SANDY SILT to CLAYEY SILT	21	22		3.5	
5.100	16.73	61.76	3.19	SANDY SILT to CLAYEY SILT	25	25		3.6	
5.250	17.22	28.02	4.68	CLAY	28	28		1.6	
5.400	17.72	83.34	3.02	SANDY SILT to CLAYEY SILT	33	33		4.8	
5.550	18.21	46.16	3.53	CLAYEY SILT to SILTY CLAY	23	23		2.7	
5.700	18.70	16.87	2.55	CLAYEY SILT to SILTY CLAY	8	8		1.1	
5.850	19.19	12.02	4.24	CLAY	12	11		.7	
6.000	19.69	16.72	3.35	CLAY to SILTY CLAY	11	10		1.0	
6.150	20.18	16.17	3.03	CLAYEY SILT to SILTY CLAY	8	8		1.0	

TOP 1.0 ft IS DISTURBED SOIL
*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-1

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
6.300	20.67	11.85	3.04	CLAY to SILTY CLAY	8	7		.7	
6.450	21.16	10.71	2.61	CLAY to SILTY CLAY	7	6		.8	
6.600	21.65	28.40	3.49	CLAYEY SILT to SILTY CLAY	14	13		1.8	
6.750	22.15	21.65	4.80	CLAY	22	19		1.4	
6.900	22.64	13.45	3.20	CLAY to SILTY CLAY	9	8		.8	
7.050	23.13	45.72	3.06	CLAYEY SILT to SILTY CLAY	23	20		3.0	
7.200	23.62	61.57	3.96	CLAYEY SILT to SILTY CLAY	31	26		3.5	
7.350	24.11	102.61	3.00	SANDY SILT to CLAYEY SILT	41	35		6.0	
7.500	24.61	123.07	3.10	SANDY SILT to CLAYEY SILT	49	41		7.2	
7.650	25.10	67.56	3.49	CLAYEY SILT to SILTY CLAY	34	28		3.9	
7.800	25.59	12.26	4.32	CLAY	12	10		.7	
7.950	26.08	12.60	6.03	CLAY	13	10		.7	
8.100	26.57	30.74	4.55	CLAY to SILTY CLAY	20	17		1.7	
8.250	27.07	15.25	2.36	CLAYEY SILT to SILTY CLAY	8	6		1.1	
8.400	27.56	11.88	3.79	CLAY	12	9		.7	
8.550	28.05	13.38	3.36	CLAY to SILTY CLAY	9	7		.8	
8.700	28.54	10.96	3.47	CLAY	11	9		.6	
8.850	29.04	13.28	3.46	CLAY to SILTY CLAY	9	7		.8	
9.000	29.53	15.57	3.08	CLAY to SILTY CLAY	10	8		.9	
9.150	30.02	19.33	3.26	CLAYEY SILT to SILTY CLAY	10	7		1.2	
9.300	30.51	28.09	3.77	CLAY to SILTY CLAY	19	14		1.8	
9.450	31.00	36.24	3.50	CLAYEY SILT to SILTY CLAY	18	14		2.3	
9.600	31.50	78.05	2.59	SANDY SILT to CLAYEY SILT	31	23		5.1	
9.750	31.99	108.45	2.75	SANDY SILT to CLAYEY SILT	43	32		6.3	
9.900	32.48	141.75	2.66	SILTY SAND to SANDY SILT	47	35	68		38.5
10.050	32.97	165.14	2.74	SILTY SAND to SANDY SILT	55	40	72		39.5
10.200	33.46	173.70	2.98	SILTY SAND to SANDY SILT	58	42	73		39.5
10.350	33.96	187.83	2.80	SILTY SAND to SANDY SILT	63	45	75		39.5
10.500	34.45	211.11	2.74	SILTY SAND to SANDY SILT	70	50	79		40.5
10.650	34.94	197.90	2.68	SILTY SAND to SANDY SILT	66	47	77		40.0
10.800	35.43	206.07	2.80	SILTY SAND to SANDY SILT	69	48	77		40.0
10.950	35.93	238.58	3.01	SILTY SAND to SANDY SILT	80	55	81		41.0
11.100	36.42	232.40	3.04	SILTY SAND to SANDY SILT	77	54	81		40.5
11.250	36.91	205.52	2.85	SILTY SAND to SANDY SILT	69	47	77		39.5
11.400	37.40	184.60	2.67	SILTY SAND to SANDY SILT	62	42	74		39.0
11.550	37.89	74.36	4.21	CLAYEY SILT to SILTY CLAY	37	25		4.2	
11.700	38.39	20.37	2.21	CLAYEY SILT to SILTY CLAY	10	7		1.5	
11.850	38.88	40.98	3.54	CLAYEY SILT to SILTY CLAY	20	14		2.6	
12.000	39.37	54.77	3.72	CLAYEY SILT to SILTY CLAY	27	18		3.1	
12.150	39.86	88.65	3.44	SANDY SILT to CLAYEY SILT	35	23		5.1	
12.300	40.35	64.58	3.62	CLAYEY SILT to SILTY CLAY	32	21		3.7	
12.450	40.85	82.41	3.28	SANDY SILT to CLAYEY SILT	33	22		4.7	
12.600	41.34	97.85	2.51	SILTY SAND to SANDY SILT	33	21	54		36.5
12.750	41.83	90.06	3.52	SANDY SILT to CLAYEY SILT	36	23		5.2	
12.900	42.32	30.59	4.32	CLAY to SILTY CLAY	20	13		1.7	
13.050	42.81	37.54	4.21	CLAY to SILTY CLAY	25	16		2.1	
13.200	43.31	62.82	2.80	SANDY SILT to CLAYEY SILT	25	16		4.0	
13.350	43.80	51.20	3.69	CLAYEY SILT to SILTY CLAY	26	16		2.9	
13.500	44.29	99.70	3.04	SANDY SILT to CLAYEY SILT	40	25		5.7	
13.650	44.78	52.05	3.94	CLAYEY SILT to SILTY CLAY	26	16		2.9	

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-1

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	SOIL BEHAVIOR TYPE	N(60)	N1(60)	Dr (%)	Su (tsf)	PHI (Degrees)
13.800	45.28	119.69	2.97	SANDY SILT to CLAYEY SILT	48	30		6.9	
13.950	45.77	115.49	3.07	SANDY SILT to CLAYEY SILT	46	29		6.6	
14.100	46.26	41.36	5.32	CLAY	41	26		2.3	
14.250	46.75	20.29	3.84	CLAY to SILTY CLAY	14	8		1.2	
14.400	47.24	26.94	4.05	CLAY to SILTY CLAY	18	11		1.6	
14.550	47.74	38.94	4.06	CLAYEY SILT to SILTY CLAY	19	12		2.1	
14.700	48.23	21.18	4.01	CLAY to SILTY CLAY	14	9		1.2	
14.850	48.72	79.73	3.36	SANDY SILT to CLAYEY SILT	32	20		4.5	
15.000	49.21	120.44	3.19	SANDY SILT to CLAYEY SILT	48	30		6.9	
15.150	49.70	68.62	4.72	CLAY to SILTY CLAY	46	28		3.9	
15.300	50.20	27.32	5.42	CLAY	27	17		1.4	
15.450	50.69	66.64	4.49	CLAYEY SILT to SILTY CLAY	33	20		3.7	
15.600	51.18	52.79	3.94	CLAYEY SILT to SILTY CLAY	26	16		2.9	
15.750	51.67	41.47	3.06	CLAYEY SILT to SILTY CLAY	21	13		2.6	
15.900	52.17	58.89	3.33	CLAYEY SILT to SILTY CLAY	29	18		3.3	
16.050	52.66	56.68	3.95	CLAYEY SILT to SILTY CLAY	28	17		3.2	
16.200	53.15	26.36	3.07	CLAYEY SILT to SILTY CLAY	13	8		1.6	
16.350	53.64	28.21	3.44	CLAYEY SILT to SILTY CLAY	14	9		1.7	
16.500	54.13	27.49	3.56	CLAYEY SILT to SILTY CLAY	14	8		1.6	
16.650	54.63	92.12	3.19	SANDY SILT to CLAYEY SILT	37	22		5.2	
16.800	55.12	70.60	3.24	SANDY SILT to CLAYEY SILT	28	17		4.0	
16.950	55.61	29.47	4.78	CLAY	29	18		1.5	
17.100	56.10	72.72	3.81	CLAYEY SILT to SILTY CLAY	36	22		4.1	
17.250	56.59	61.33	3.88	CLAYEY SILT to SILTY CLAY	31	18		3.4	
17.400	57.09	59.08	4.15	CLAYEY SILT to SILTY CLAY	30	18		3.3	
17.550	57.58	82.41	4.00	CLAYEY SILT to SILTY CLAY	41	24		4.7	
17.700	58.07	99.49	3.58	SANDY SILT to CLAYEY SILT	40	23		5.7	
17.850	58.56	44.55	4.04	CLAYEY SILT to SILTY CLAY	22	13		2.4	
18.000	59.06	51.09	2.90	SANDY SILT to CLAYEY SILT	20	12		3.2	
18.150	59.55	39.28	5.02	CLAY	39	23		2.1	
18.300	60.04	99.57	3.32	SANDY SILT to CLAYEY SILT	40	23		5.7	
18.450	60.53	92.95	4.01	CLAYEY SILT to SILTY CLAY	46	27		5.3	
18.600	61.02	72.66	3.99	CLAYEY SILT to SILTY CLAY	36	21		4.1	
18.750	61.52	57.47	3.78	CLAYEY SILT to SILTY CLAY	29	17		3.2	
18.900	62.01	45.17	4.12	CLAYEY SILT to SILTY CLAY	23	13		2.4	
19.050	62.50	128.08	2.98	SANDY SILT to CLAYEY SILT	51	30		7.3	
19.200	62.99	154.02	2.96	SANDY SILT to CLAYEY SILT	62	36		8.8	
19.350	63.48	110.90	4.30	*VERY STIFF FINE GRAINED	100	64			
19.500	63.98	174.06	3.23	SANDY SILT to CLAYEY SILT	70	40		10.0	
19.650	64.47	206.24	2.97	SILTY SAND to SANDY SILT	69	39	72		38.5
19.800	64.96	213.89	2.49	SILTY SAND to SANDY SILT	71	41	73		38.5
19.950	65.45	197.81	2.65	SILTY SAND to SANDY SILT	66	38	70		38.0
20.100	65.94	178.61	3.08	SANDY SILT to CLAYEY SILT	71	41		10.3	
20.250	66.44	220.44	2.38	SILTY SAND to SANDY SILT	73	42	73		38.5
20.400	66.93	247.91	2.43	SILTY SAND to SANDY SILT	83	47	77		39.0
20.550	67.42	187.12	2.28	SILTY SAND to SANDY SILT	62	35	69		38.0
20.700	67.91	146.38	2.02	SILTY SAND to SANDY SILT	49	28	62		37.0
20.850	68.41	172.70	1.94	SILTY SAND to SANDY SILT	58	32	66		38.0
21.000	68.90	258.61	1.72	SAND to SILTY SAND	65	36	78		39.0
21.150	69.39	172.10	1.63	SAND to SILTY SAND	43	24	66		38.0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)
N1(60) = OVERBURDEN NORMALIZED EQUIVALENT SPT VALUE (60% Energy)
Dr = OVERBURDEN NORMALIZED EQUIVALENT RELATIVE DENSITY
Su = OVERBURDEN NORMALIZED UNDRAINED SHEAR STRENGTH
PHI = OVERBURDEN NORMALIZED EQUIVALENT FRICTION ANGLE

HOLGUIN, FAHAN & ASSOCIATES, INC.

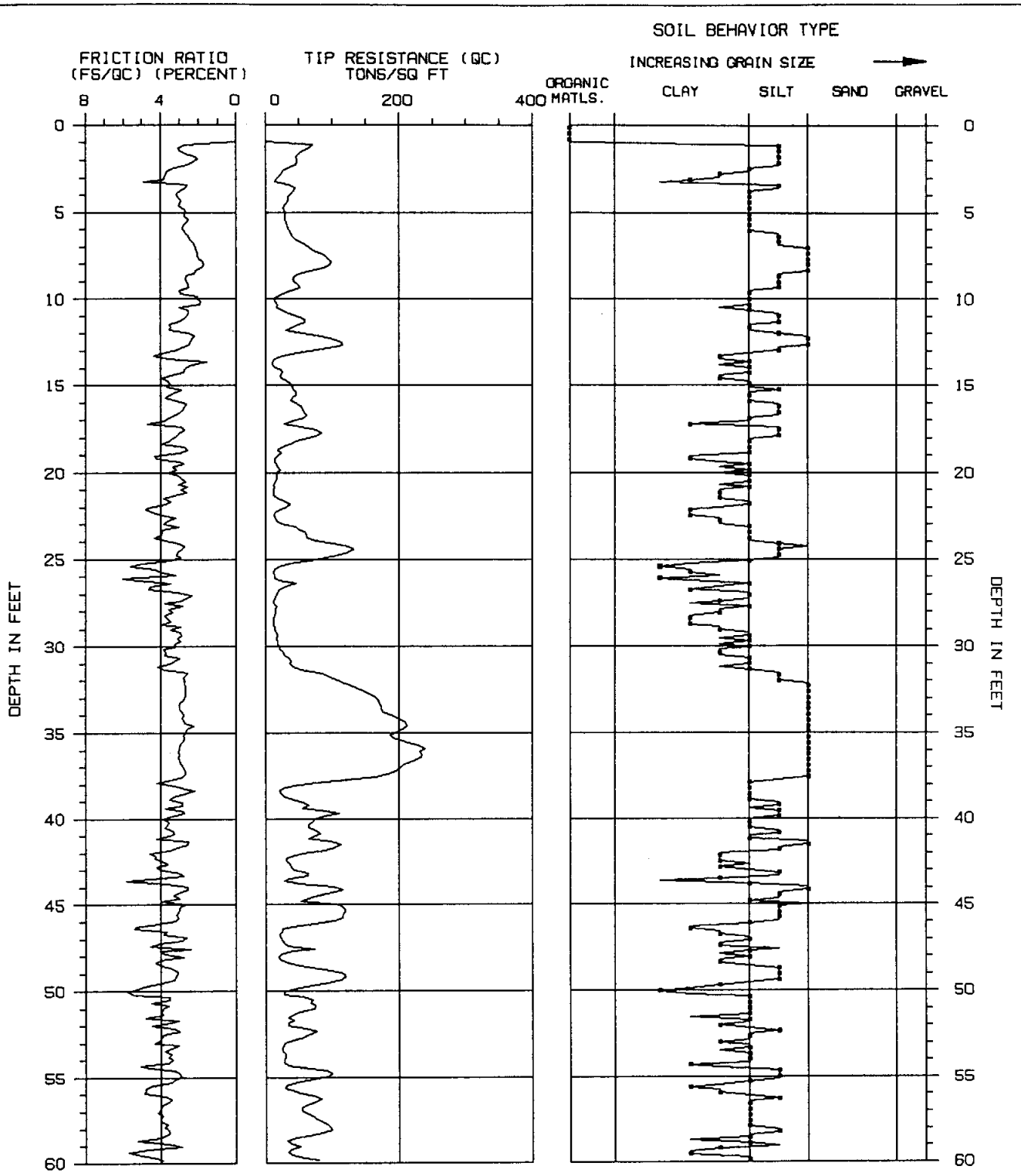
Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-1

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
21.300	69.88	45.6	3.97	-.13	CLAYEY SILT to SILTY CLAY	23
21.450	70.37	33.0	3.79	-.14	CLAYEY SILT to SILTY CLAY	17
21.600	70.87	47.5	5.26	-.13	CLAY	48
21.750	71.36	135.0	3.19	-.14	SANDY SILT to CLAYEY SILT	54
21.900	71.85	76.0	4.34	-.15	CLAYEY SILT to SILTY CLAY	38
22.050	72.34	106.8	3.53	-.15	SANDY SILT to CLAYEY SILT	43
22.200	72.83	164.8	3.35	-.14	SANDY SILT to CLAYEY SILT	66
22.350	73.33	155.0	3.86	-.15	*SAND to CLAYEY SAND	78
22.500	73.82	166.9	3.73	-.15	*SAND to CLAYEY SAND	83
22.650	74.31	157.9	3.54	-.14	SANDY SILT to CLAYEY SILT	63
22.800	74.80	144.8	3.72	-.14	SANDY SILT to CLAYEY SILT	58
22.950	75.30	50.2	5.73	-.14	CLAY	50
23.100	75.79	28.5	3.26	-.15	CLAYEY SILT to SILTY CLAY	14
23.250	76.28	32.9	3.49	-.15	CLAYEY SILT to SILTY CLAY	16
23.400	76.77	35.5	3.66	-.15	CLAYEY SILT to SILTY CLAY	18
23.550	77.26	36.0	3.52	-.15	CLAYEY SILT to SILTY CLAY	18
23.700	77.76	57.6	3.80	-.15	CLAYEY SILT to SILTY CLAY	29
23.850	78.25	82.3	3.96	-.15	CLAYEY SILT to SILTY CLAY	41
24.000	78.74	99.0	4.07	-.15	CLAYEY SILT to SILTY CLAY	49
24.150	79.23	111.9	1.77	-.15	SILTY SAND to SANDY SILT	37
24.300	79.72	37.0	4.60	-.15	CLAY to SILTY CLAY	25
24.450	80.22	48.0	4.64	-.15	CLAY to SILTY CLAY	32
24.600	80.71	230.4	2.80	-.15	SILTY SAND to SANDY SILT	77
24.750	81.20	101.6	4.90	-.15	*VERY STIFF FINE GRAINED	100
24.900	81.69	32.4	6.91	-.14	CLAY	32
25.050	82.19	164.6	3.47	-.14	SANDY SILT to CLAYEY SILT	66
25.200	82.68	61.7	6.28	-.14	CLAY	62
25.350	83.17	29.3	4.23	-.15	CLAY to SILTY CLAY	20
25.500	83.66	31.0	3.38	-.15	CLAYEY SILT to SILTY CLAY	16
25.650	84.15	27.4	4.16	-.14	CLAY to SILTY CLAY	18
25.800	84.65	24.6	3.73	-.13	CLAY to SILTY CLAY	16
25.950	85.14	26.9	5.06	-.13	CLAY	27
26.100	85.63	107.4	3.79	-.13	CLAYEY SILT to SILTY CLAY	54
26.250	86.12	169.6	3.96	-.13	*SAND to CLAYEY SAND	85
26.400	86.61	188.1	4.02	-.12	*SAND to CLAYEY SAND	94
26.550	87.11	186.5	3.92	-.12	*SAND to CLAYEY SAND	93
26.700	87.60	128.2	4.34	-.12	*VERY STIFF FINE GRAINED	100
26.850	88.09	158.8	3.53	-.12	SANDY SILT to CLAYEY SILT	64
27.000	88.58	133.0	4.15	-.12	*VERY STIFF FINE GRAINED	100
27.150	89.07	70.4	4.53	-.12	CLAY to SILTY CLAY	47
27.300	89.57	184.1	3.51	-.12	*SAND to CLAYEY SAND	92
27.450	90.06	185.8	3.91	-.12	*SAND to CLAYEY SAND	93

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

Interpretations based on: Robertson and Campanella, 1989.



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

ASSUMED TOTAL UNIT WT = 115 PCF

ASSUMED DEPTH OF WATER TABLE = 43.0 FT

SOIL BEHAVIOR TYPE INTERPRETATIONS BASED ON: GUIDELINES FOR GEOTECHNICAL DESIGN USING THE CPT AND CPTU. SOIL MECHANICS SERIES #120. UNIVERSITY OF BRITISH COLUMBIA, SEPTEMBER 1989. BY P.K. ROBERTSON AND R.G. CAMPANELLA.

CONE PENETRATION TEST SOUNDING NUMBER: CPT-1 (1 OF 2)

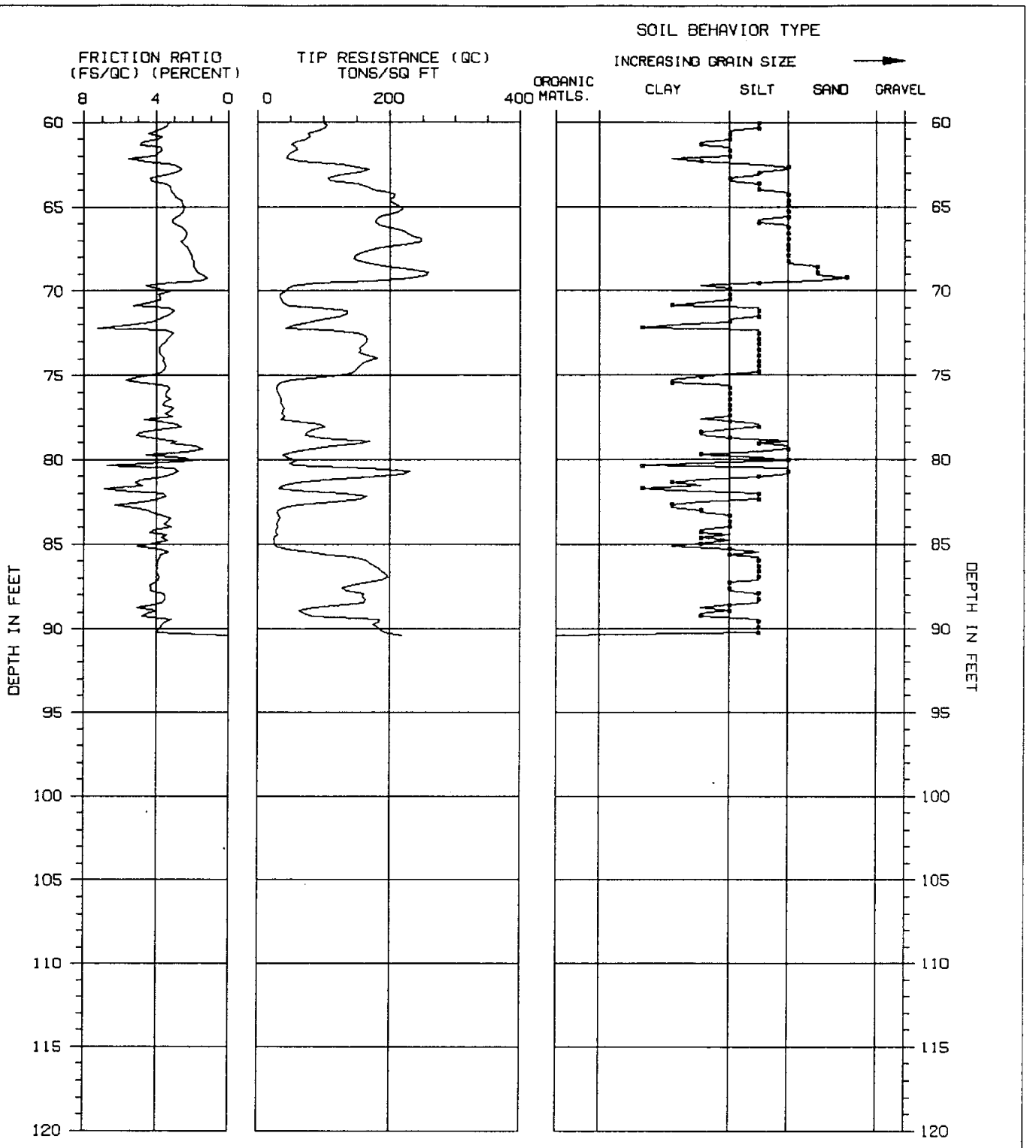
PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-01-98 06:49

HFA



TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

ASSUMED TOTAL UNIT WT = 115 PCF

ASSUMED DEPTH OF WATER TABLE = 43.0 FT

SOIL BEHAVIOR TYPE INTERPRETATIONS BASED ON: GUIDELINES FOR GEOTECHNICAL DESIGN USING THE CPT AND CPTU. SOIL MECHANICS SERIES #120. UNIVERSITY OF BRITISH COLUMBIA, SEPTEMBER 1989. BY P.K. ROBERTSON AND R.G. CAMPANELLA.

CONE PENETRATION TEST SOUNDING NUMBER: CPT-1 (2 OF 2)

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-01-98 06:49

HFA

CONE PENETRATION TEST

SOUNDING : CPT-2
PROJECT : EKI/WEBB
DATE/TIME: 10-01-98 14:18

PROJECT No.: 98-E623
CONE/RIG : 473/R#3 KC/MR

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
.150	.49	.0	.00	.00		0
.300	.98	.0	.00	.00		0
.450	1.48	96.5	1.85	6.44	SILTY SAND to SANDY SILT	32
.600	1.97	40.1	2.22	.05	SANDY SILT to CLAYEY SILT	16
.750	2.46	115.7	1.04	.52	SAND to SILTY SAND	29
.900	2.95	93.3	.98	.53	SAND to SILTY SAND	23
1.050	3.44	112.8	.74	.58	SAND to SILTY SAND	28
1.200	3.94	86.0	.62	.55	SAND to SILTY SAND	22
1.350	4.43	25.8	1.63	.24	SANDY SILT to CLAYEY SILT	10
1.500	4.92	23.9	1.55	.13	SANDY SILT to CLAYEY SILT	10
1.650	5.41	28.0	1.28	.01	SANDY SILT to CLAYEY SILT	11
1.800	5.91	26.9	1.45	.00	SANDY SILT to CLAYEY SILT	11
1.950	6.40	25.9	1.70	-.01	SANDY SILT to CLAYEY SILT	10
2.100	6.89	29.9	1.74	.06	SANDY SILT to CLAYEY SILT	12
2.250	7.38	27.6	2.72	.12	CLAYEY SILT to SILTY CLAY	14
2.400	7.87	30.3	1.88	.21	SANDY SILT to CLAYEY SILT	12
2.550	8.37	50.3	1.21	.25	SILTY SAND to SANDY SILT	17
2.700	8.86	48.7	1.42	.21	SILTY SAND to SANDY SILT	16
2.850	9.35	47.6	1.77	.12	SILTY SAND to SANDY SILT	16
3.000	9.84	59.0	1.10	.22	SILTY SAND to SANDY SILT	20
3.150	10.33	61.8	1.23	.32	SILTY SAND to SANDY SILT	21
3.300	10.83	27.9	1.72	.29	SANDY SILT to CLAYEY SILT	11
3.450	11.32	13.9	1.87	.29	CLAYEY SILT to SILTY CLAY	7
3.600	11.81	37.5	1.68	.41	SANDY SILT to CLAYEY SILT	15
3.750	12.30	63.8	.97	.56	SILTY SAND to SANDY SILT	21
3.900	12.80	60.5	1.32	.61	SILTY SAND to SANDY SILT	20
4.050	13.29	51.7	1.55	.60	SILTY SAND to SANDY SILT	17
4.200	13.78	92.2	1.41	.79	SILTY SAND to SANDY SILT	31
4.350	14.27	115.3	.75	1.11	SAND to SILTY SAND	29
4.500	14.76	30.0	2.53	.60	SANDY SILT to CLAYEY SILT	12
4.650	15.26	7.5	2.00	1.28	CLAY to SILTY CLAY	5
4.800	15.75	14.2	2.39	1.76	CLAYEY SILT to SILTY CLAY	7
4.950	16.24	16.1	1.62	3.95	SANDY SILT to CLAYEY SILT	6
5.100	16.73	18.4	1.52	4.34	SANDY SILT to CLAYEY SILT	7
5.250	17.22	14.3	1.82	4.92	CLAYEY SILT to SILTY CLAY	7
5.400	17.72	14.6	1.71	5.22	CLAYEY SILT to SILTY CLAY	7
5.550	18.21	30.9	1.43	7.94	SANDY SILT to CLAYEY SILT	12
5.700	18.70	17.1	2.52	2.35	CLAYEY SILT to SILTY CLAY	9
5.850	19.19	26.8	2.20	2.93	SANDY SILT to CLAYEY SILT	11
6.000	19.69	24.9	2.17	3.49	SANDY SILT to CLAYEY SILT	10
6.150	20.18	31.8	2.29	4.39	SANDY SILT to CLAYEY SILT	13

TOP 1.0 ft IS DISTURBED SOIL
*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

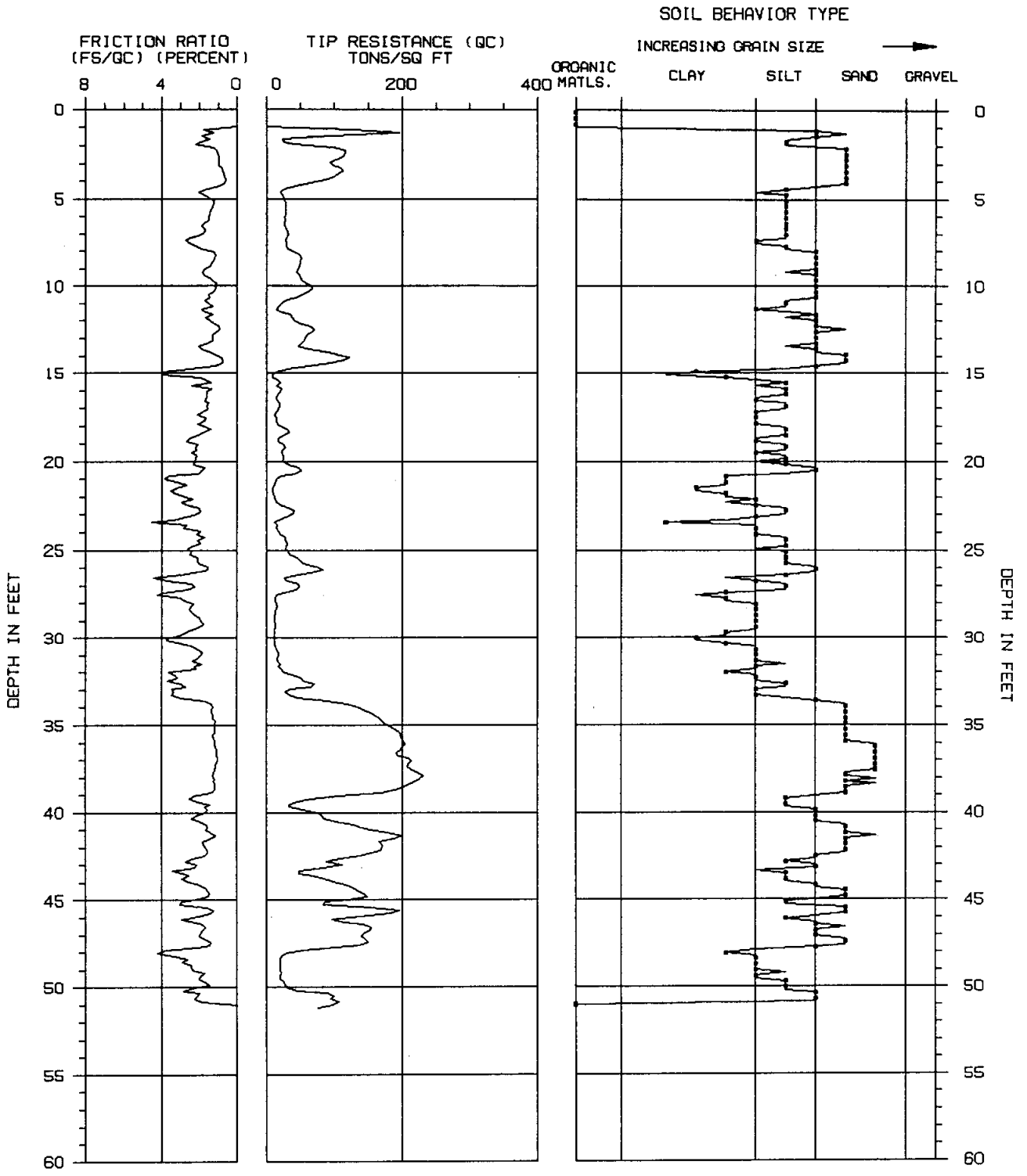
SOUNDING : CPT-2

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
6.300	20.67	42.3	2.04	3.12	SANDY SILT to CLAYEY SILT	17
6.450	21.16	12.1	3.23	2.24	CLAY to SILTY CLAY	8
6.600	21.65	8.8	3.51	2.39	CLAY	9
6.750	22.15	12.2	2.37	3.05	CLAYEY SILT to SILTY CLAY	6
6.900	22.64	32.0	2.03	4.56	SANDY SILT to CLAYEY SILT	13
7.050	23.13	27.2	2.72	4.29	CLAYEY SILT to SILTY CLAY	14
7.200	23.62	15.3	2.68	3.75	CLAYEY SILT to SILTY CLAY	8
7.350	24.11	19.4	2.17	5.21	CLAYEY SILT to SILTY CLAY	10
7.500	24.61	29.9	1.94	6.09	SANDY SILT to CLAYEY SILT	12
7.650	25.10	31.6	2.43	4.35	SANDY SILT to CLAYEY SILT	13
7.800	25.59	49.3	2.09	4.43	SANDY SILT to CLAYEY SILT	20
7.950	26.08	82.9	1.56	5.79	SILTY SAND to SANDY SILT	28
8.100	26.57	26.2	4.46	2.18	CLAY to SILTY CLAY	17
8.250	27.07	48.7	2.24	3.69	SANDY SILT to CLAYEY SILT	19
8.400	27.56	14.6	4.24	1.88	CLAY	15
8.550	28.05	14.3	2.30	1.77	CLAYEY SILT to SILTY CLAY	7
8.700	28.54	12.0	2.34	1.92	CLAYEY SILT to SILTY CLAY	6
8.850	29.04	10.7	1.96	2.41	CLAYEY SILT to SILTY CLAY	5
9.000	29.53	11.5	2.43	3.09	CLAYEY SILT to SILTY CLAY	6
9.150	30.02	11.0	3.72	3.78	CLAY	11
9.300	30.51	12.6	2.38	4.73	CLAYEY SILT to SILTY CLAY	6
9.450	31.00	16.9	1.96	7.16	CLAYEY SILT to SILTY CLAY	8
9.600	31.50	19.6	1.89	8.16	SANDY SILT to CLAYEY SILT	8
9.750	31.99	24.7	3.65	6.31	CLAY to SILTY CLAY	16
9.900	32.48	53.5	3.68	12.44	CLAYEY SILT to SILTY CLAY	27
10.050	32.97	36.7	3.46	7.05	CLAYEY SILT to SILTY CLAY	18
10.200	33.46	45.9	2.98	12.85	SANDY SILT to CLAYEY SILT	18
10.350	33.96	133.2	1.28	8.15	SAND to SILTY SAND	33
10.500	34.45	158.8	1.30	3.77	SAND to SILTY SAND	40
10.650	34.94	174.6	1.19	2.80	SAND to SILTY SAND	44
10.800	35.43	196.6	1.21	1.51	SAND to SILTY SAND	49
10.950	35.93	202.3	1.21	1.73	SAND to SILTY SAND	51
11.100	36.42	197.0	1.08	1.79	SAND	39
11.250	36.91	208.5	1.05	1.27	SAND	42
11.400	37.40	207.5	1.16	1.25	SAND	41
11.550	37.89	231.6	1.30	1.23	SAND to SILTY SAND	58
11.700	38.39	210.7	1.20	.79	SAND	42
11.850	38.88	168.8	1.38	.70	SAND to SILTY SAND	42
12.000	39.37	44.5	2.09	.25	SANDY SILT to CLAYEY SILT	18
12.150	39.86	54.3	1.55	.21	SILTY SAND to SANDY SILT	18
12.300	40.35	84.6	2.42	.91	SILTY SAND to SANDY SILT	28
12.450	40.85	139.6	1.58	3.65	SAND to SILTY SAND	35
12.600	41.34	199.9	1.14	8.86	SAND	40
12.750	41.83	170.2	1.80	4.37	SAND to SILTY SAND	43
12.900	42.32	154.3	1.59	4.74	SAND to SILTY SAND	39
13.050	42.81	87.4	2.76	2.73	SANDY SILT to CLAYEY SILT	35
13.200	43.31	48.0	3.42	3.31	CLAYEY SILT to SILTY CLAY	24
13.350	43.80	84.9	2.97	6.33	SANDY SILT to CLAYEY SILT	34
13.500	44.29	127.9	1.67	13.61	SILTY SAND to SANDY SILT	43
13.650	44.78	149.1	1.54	17.76	SAND to SILTY SAND	37

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

Interpretations based on: Robertson and Campanella, 1989.

HOLGUIN, FAHAN & ASSOCIATES, INC.



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

ASSUMED TOTAL UNIT WT = 115 PCF

ASSUMED DEPTH OF WATER TABLE = 43.0 FT

SOIL BEHAVIOR TYPE INTERPRETATIONS BASED ON: GUIDELINES FOR GEOTECHNICAL DESIGN USING THE CPT AND CPTU. SOIL MECHANICS SERIES #120, UNIVERSITY OF BRITISH COLUMBIA, SEPTEMBER 1989, BY P.K. ROBERTSON AND R.G. CAMPANELLA.

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-2

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-01-98 14:18

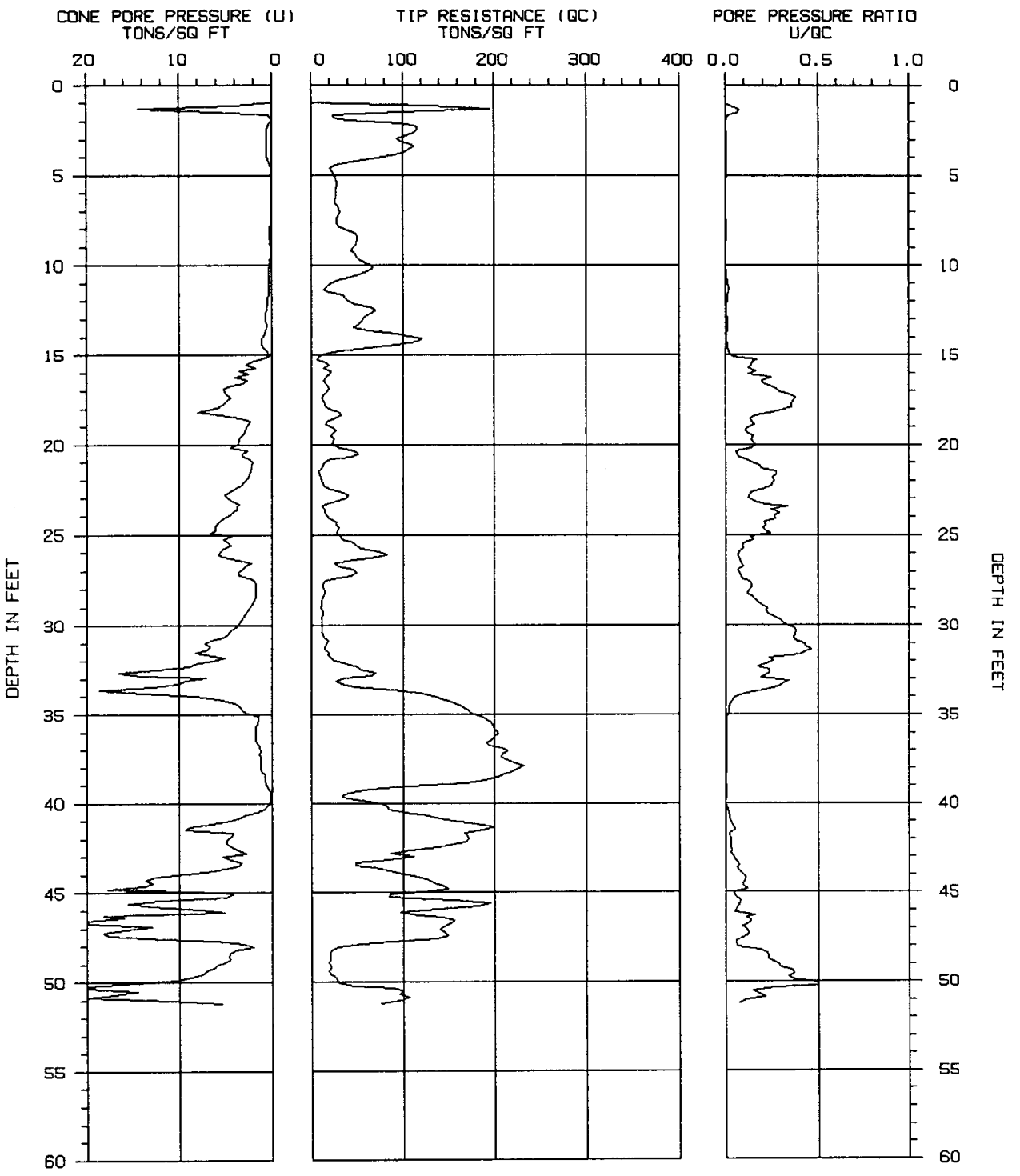
HFA

SOUNDING : CPT-2

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
13.800	45.28	84.2	3.07	4.91	SANDY SILT to CLAYEY SILT	34
13.950	45.77	182.6	1.39	13.01	SAND to SILTY SAND	46
14.100	46.26	116.2	2.21	18.13	SILTY SAND to SANDY SILT	39
14.250	46.75	152.5	1.81	19.81	SILTY SAND to SANDY SILT	51
14.400	47.24	146.2	1.69	18.16	SAND to SILTY SAND	37
14.550	47.74	103.0	2.10	6.14	SILTY SAND to SANDY SILT	34
14.700	48.23	21.1	3.36	3.95	CLAYEY SILT to SILTY CLAY	11
14.850	48.72	19.9	2.41	4.54	CLAYEY SILT to SILTY CLAY	10
15.000	49.21	21.1	1.71	6.22	SANDY SILT to CLAYEY SILT	8
15.150	49.70	25.5	1.68	8.63	SANDY SILT to CLAYEY SILT	10
15.300	50.20	45.4	2.86	22.63	SANDY SILT to CLAYEY SILT	18
15.450	50.69	95.6	2.24	16.93	SILTY SAND to SANDY SILT	32

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

Interpretations based on: Robertson and Campanella, 1989.



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-2

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-01-98 14:18

HFA

SOUNDING : CPT-3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
6.300	20.67	71.6	2.46	.35	SANDY SILT to CLAYEY SILT	29
6.450	21.16	51.3	3.59	.35	CLAYEY SILT to SILTY CLAY	26
6.600	21.65	44.3	3.41	.31	CLAYEY SILT to SILTY CLAY	22
6.750	22.15	63.1	2.58	.33	SANDY SILT to CLAYEY SILT	25
6.900	22.64	82.1	2.56	.36	SANDY SILT to CLAYEY SILT	33
7.050	23.13	140.8	2.07	.41	SILTY SAND to SANDY SILT	47
7.200	23.62	181.5	1.76	.47	SAND to SILTY SAND	45
7.350	24.11	127.7	2.04	.47	SILTY SAND to SANDY SILT	43
7.500	24.61	52.6	2.91	.41	SANDY SILT to CLAYEY SILT	21
7.650	25.10	20.0	4.05	.30	CLAY to SILTY CLAY	13
7.800	25.59	25.5	3.13	.28	CLAYEY SILT to SILTY CLAY	13
7.950	26.08	16.2	2.28	.27	CLAYEY SILT to SILTY CLAY	8
8.100	26.57	15.7	4.26	.25	CLAY	16
8.250	27.07	20.2	3.87	.26	CLAY to SILTY CLAY	13
8.400	27.56	13.7	4.10	.26	CLAY	14
8.550	28.05	27.1	2.91	.34	CLAYEY SILT to SILTY CLAY	14
8.700	28.54	40.3	2.18	.43	SANDY SILT to CLAYEY SILT	16
8.850	29.04	45.5	2.38	.54	SANDY SILT to CLAYEY SILT	18
9.000	29.53	81.3	2.07	.69	SILTY SAND to SANDY SILT	27
9.150	30.02	84.3	2.49	.81	SANDY SILT to CLAYEY SILT	34
9.300	30.51	60.2	2.92	.85	SANDY SILT to CLAYEY SILT	24
9.450	31.00	38.3	4.31	.80	CLAY to SILTY CLAY	26
9.600	31.50	142.1	1.64	.98	SAND to SILTY SAND	36
9.750	31.99	161.5	1.62	.98	SAND to SILTY SAND	40
9.900	32.48	174.2	1.57	.96	SAND to SILTY SAND	44
10.050	32.97	171.2	1.85	.93	SAND to SILTY SAND	43
10.200	33.46	218.4	1.56	.92	SAND to SILTY SAND	55
10.350	33.96	217.7	1.46	.90	SAND to SILTY SAND	54
10.500	34.45	178.7	1.67	.81	SAND to SILTY SAND	45
10.650	34.94	208.6	1.27	.81	SAND to SILTY SAND	52
10.800	35.43	147.6	1.51	.81	SAND to SILTY SAND	37
10.950	35.93	33.0	2.82	.78	CLAYEY SILT to SILTY CLAY	16
11.100	36.42	51.1	2.48	.77	SANDY SILT to CLAYEY SILT	20
11.250	36.91	76.7	2.24	.77	SILTY SAND to SANDY SILT	26
11.400	37.40	96.8	2.06	.98	SILTY SAND to SANDY SILT	32
11.550	37.89	184.7	1.38	1.18	SAND to SILTY SAND	46
11.700	38.39	117.8	1.94	1.17	SILTY SAND to SANDY SILT	39
11.850	38.88	104.4	2.03	1.23	SILTY SAND to SANDY SILT	35
12.000	39.37	80.5	2.45	1.27	SANDY SILT to CLAYEY SILT	32
12.150	39.86	104.7	1.55	1.43	SILTY SAND to SANDY SILT	35
12.300	40.35	60.6	2.67	1.43	SANDY SILT to CLAYEY SILT	24
12.450	40.85	38.6	4.04	1.76	CLAYEY SILT to SILTY CLAY	19
12.600	41.34	50.8	3.31	2.12	CLAYEY SILT to SILTY CLAY	25
12.750	41.83	29.4	5.38	2.25	CLAY	29
12.900	42.32	146.5	1.64	2.99	SAND to SILTY SAND	37
13.050	42.81	141.1	1.28	3.25	SAND to SILTY SAND	35
13.200	43.31	107.9	2.17	3.58	SILTY SAND to SANDY SILT	36
13.350	43.80	139.4	1.54	3.94	SAND to SILTY SAND	35
13.500	44.29	144.0	1.52	3.67	SAND to SILTY SAND	36
13.650	44.78	25.0	4.88	3.11	CLAY	25

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

Interpretations based on: Robertson and Campanella, 1989.

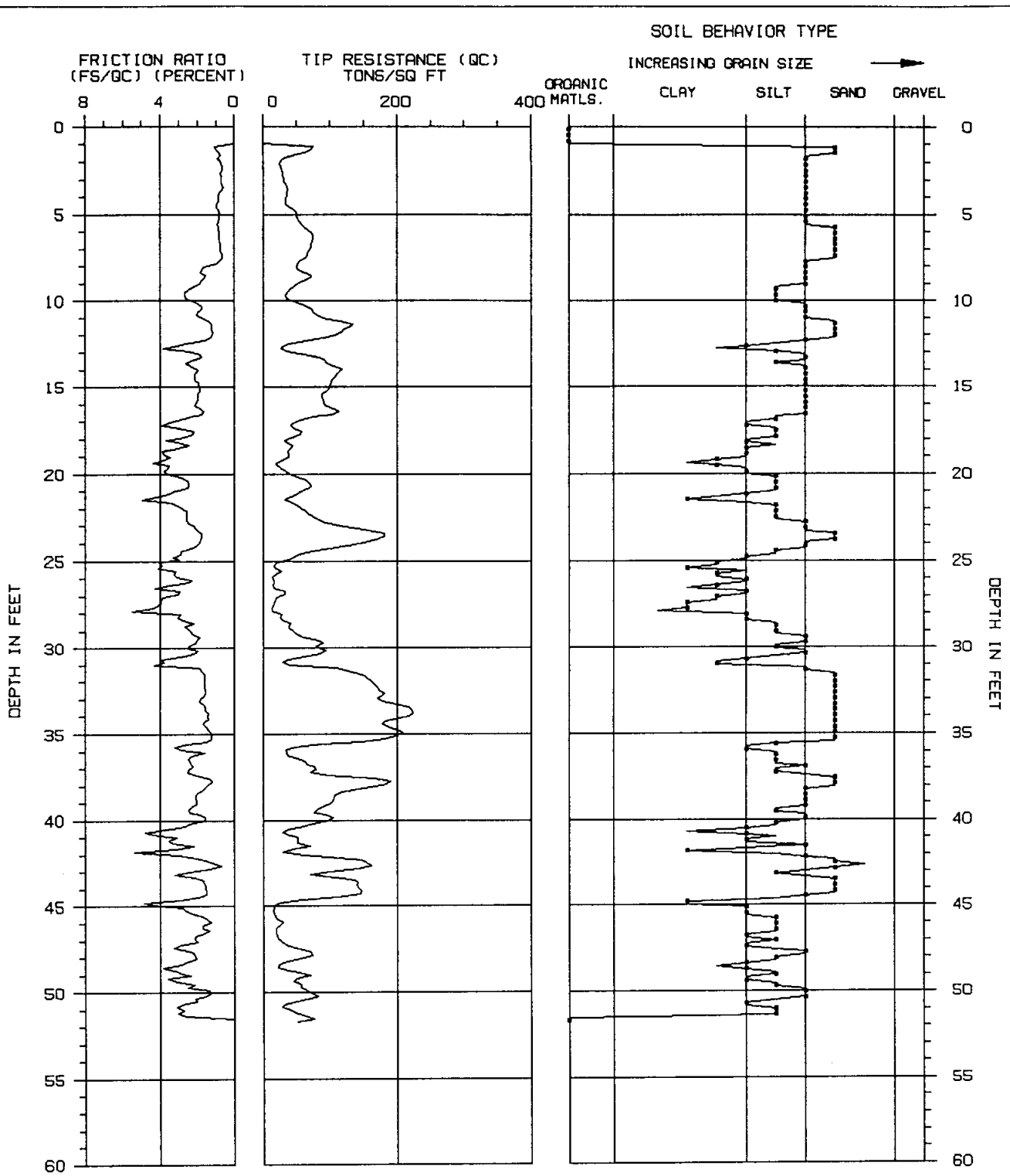
CONE PENETRATION TEST

SOUNDING : CPT-3 PROJECT No.: 98-E623
PROJECT : EKI/WEBB CONE/RIG : 473/R#3 KC/MR
DATE/TIME: 10-01-98 10:56

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
.150	.49	.0	.00	.00		0
.300	.98	.0	.00	.00		0
.450	1.48	61.3	.82	.20	SAND to SILTY SAND	15
.600	1.97	25.8	.77	.13	SILTY SAND to SANDY SILT	9
.750	2.46	28.0	.68	.13	SILTY SAND to SANDY SILT	9
.900	2.95	30.1	.70	.12	SILTY SAND to SANDY SILT	10
1.050	3.44	34.8	.63	.12	SILTY SAND to SANDY SILT	12
1.200	3.94	34.1	.85	.11	SILTY SAND to SANDY SILT	11
1.350	4.43	33.9	.97	.11	SILTY SAND to SANDY SILT	11
1.500	4.92	49.1	.84	.11	SILTY SAND to SANDY SILT	16
1.650	5.41	53.6	.86	.07	SILTY SAND to SANDY SILT	18
1.800	5.91	66.9	.87	.07	SAND to SILTY SAND	17
1.950	6.40	74.9	.80	.08	SAND to SILTY SAND	19
2.100	6.89	71.4	.77	.08	SAND to SILTY SAND	18
2.250	7.38	65.4	.64	.08	SAND to SILTY SAND	16
2.400	7.87	50.6	.99	.07	SILTY SAND to SANDY SILT	17
2.550	8.37	62.1	1.80	.14	SILTY SAND to SANDY SILT	21
2.700	8.86	59.7	1.79	.23	SILTY SAND to SANDY SILT	20
2.850	9.35	39.1	2.48	.23	SANDY SILT to CLAYEY SILT	16
3.000	9.84	35.0	2.63	.25	SANDY SILT to CLAYEY SILT	14
3.150	10.33	65.5	1.80	.31	SILTY SAND to SANDY SILT	22
3.300	10.83	81.2	2.03	.35	SILTY SAND to SANDY SILT	27
3.450	11.32	134.1	1.22	.42	SAND to SILTY SAND	34
3.600	11.81	116.9	1.20	.40	SAND to SILTY SAND	29
3.750	12.30	62.5	1.70	.39	SILTY SAND to SANDY SILT	21
3.900	12.80	25.3	3.87	.33	CLAY to SILTY CLAY	17
4.050	13.29	82.8	1.75	.34	SILTY SAND to SANDY SILT	28
4.200	13.78	105.6	2.35	.34	SILTY SAND to SANDY SILT	35
4.350	14.27	110.0	2.13	.34	SILTY SAND to SANDY SILT	37
4.500	14.76	101.1	1.94	.36	SILTY SAND to SANDY SILT	34
4.650	15.26	93.8	1.89	.38	SILTY SAND to SANDY SILT	31
4.800	15.75	89.1	2.01	.39	SILTY SAND to SANDY SILT	30
4.950	16.24	103.5	1.83	.40	SILTY SAND to SANDY SILT	34
5.100	16.73	74.8	2.37	.39	SANDY SILT to CLAYEY SILT	30
5.250	17.22	40.8	3.90	.36	CLAYEY SILT to SILTY CLAY	20
5.400	17.72	55.3	2.26	.35	SANDY SILT to CLAYEY SILT	22
5.550	18.21	33.9	3.07	.33	CLAYEY SILT to SILTY CLAY	17
5.700	18.70	35.6	3.93	.27	CLAYEY SILT to SILTY CLAY	18
5.850	19.19	28.4	3.87	.27	CLAY to SILTY CLAY	19
6.000	19.69	26.6	3.58	.26	CLAYEY SILT to SILTY CLAY	13
6.150	20.18	50.3	2.90	.28	SANDY SILT to CLAYEY SILT	20

TOP 1.0 ft IS DISTURBED SOIL
*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

Interpretations based on: Robertson and Campanella, 1989.



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

ASSUMED TOTAL UNIT WT = 115 PCF

ASSUMED DEPTH OF WATER TABLE = 43.0 FT

SOIL BEHAVIOR TYPE INTERPRETATIONS BASED ON: GUIDELINES FOR GEOTECHNICAL DESIGN USING THE CPT AND CPTU. SOIL MECHANICS SERIES #120. UNIVERSITY OF BRITISH COLUMBIA. SEPTEMBER 1989. BY P.K. ROBERTSON AND R.G. CAMPANELLA.

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-3

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-01-98 10:56

HFA

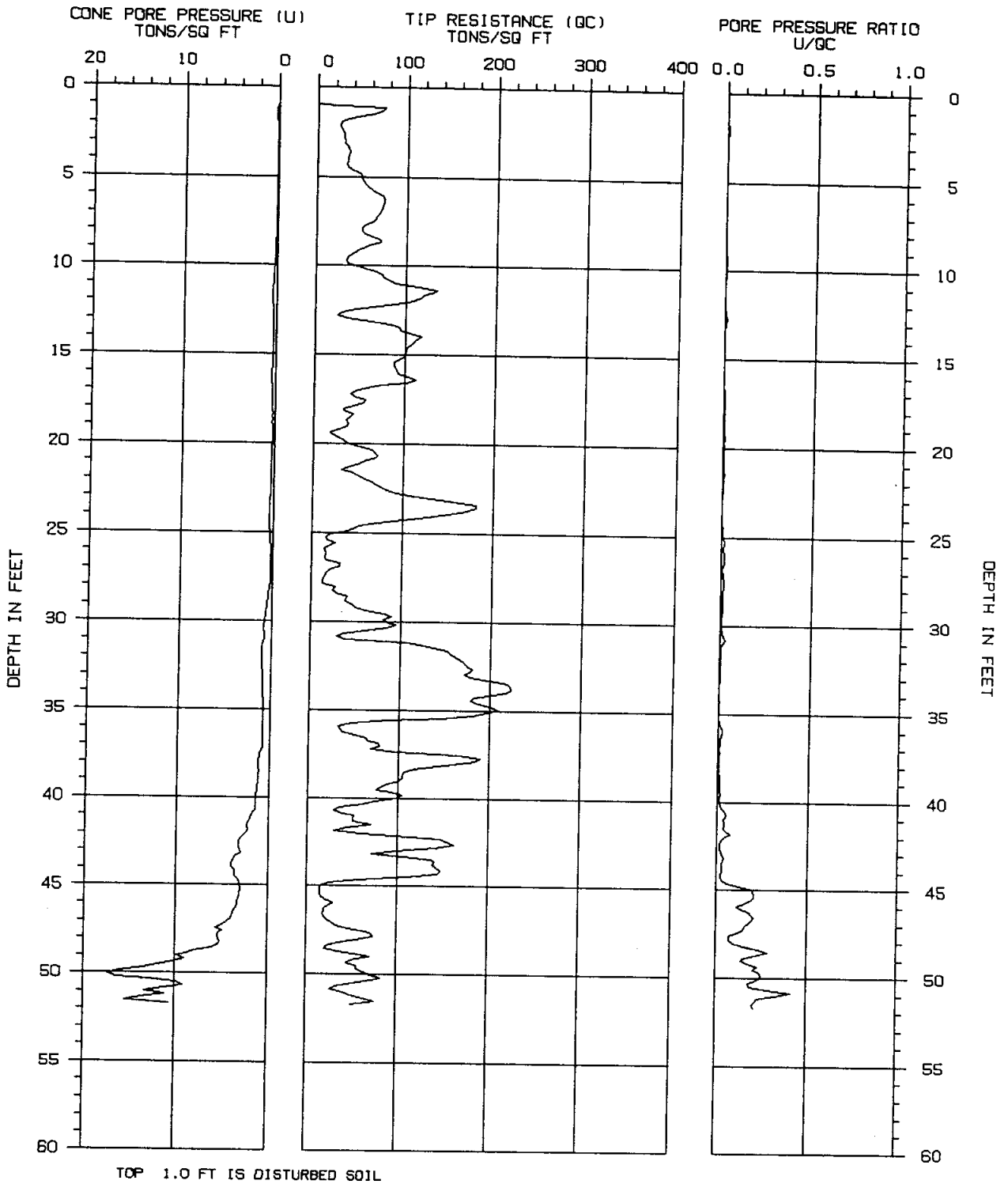
SOUNDING : CPT-3

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
13.800	45.28	14.8	2.64	3.04	CLAYEY SILT to SILTY CLAY	7
13.950	45.77	19.9	1.46	3.18	SANDY SILT to CLAYEY SILT	8
14.100	46.26	19.0	1.74	3.47	SANDY SILT to CLAYEY SILT	8
14.250	46.75	19.4	2.11	3.85	CLAYEY SILT to SILTY CLAY	10
14.400	47.24	32.8	2.93	4.89	CLAYEY SILT to SILTY CLAY	16
14.550	47.74	72.2	2.18	5.31	SILTY SAND to SANDY SILT	24
14.700	48.23	34.3	2.53	5.22	SANDY SILT to CLAYEY SILT	14
14.850	48.72	35.9	3.21	7.91	CLAYEY SILT to SILTY CLAY	18
15.000	49.21	49.9	3.61	8.96	CLAYEY SILT to SILTY CLAY	25
15.150	49.70	55.7	2.51	13.45	SANDY SILT to CLAYEY SILT	22
15.300	50.20	82.3	1.55	16.44	SILTY SAND to SANDY SILT	27
15.450	50.69	32.1	2.83	9.09	CLAYEY SILT to SILTY CLAY	16
15.600	51.18	48.8	3.05	11.12	SANDY SILT to CLAYEY SILT	20

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-3

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-01-98 10:56

HFA

CONE PENETRATION TEST

SOUNDING : CPT-4 PROJECT No.: 98-E623
PROJECT : EKI/WEBB CONE/RIG : 473/R#3 KC/MR
DATE/TIME: 10-01-98 16:57

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
.150	.49	.0	.00	.00		0
.300	.98	.0	.00	.00		0
.450	1.48	81.4	1.35	.02	SILTY SAND to SANDY SILT	27
.600	1.97	117.3	1.45	.03	SAND to SILTY SAND	29
.750	2.46	100.5	1.72	.03	SILTY SAND to SANDY SILT	34
.900	2.95	109.8	1.09	.03	SAND to SILTY SAND	27
1.050	3.44	84.0	.79	.03	SAND to SILTY SAND	21
1.200	3.94	27.9	1.83	.02	SANDY SILT to CLAYEY SILT	11
1.350	4.43	22.8	1.71	.01	SANDY SILT to CLAYEY SILT	9
1.500	4.92	24.7	1.58	.01	SANDY SILT to CLAYEY SILT	10
1.650	5.41	26.7	1.50	-.00	SANDY SILT to CLAYEY SILT	11
1.800	5.91	33.3	1.74	-.03	SANDY SILT to CLAYEY SILT	13
1.950	6.40	33.7	2.08	-.02	SANDY SILT to CLAYEY SILT	13
2.100	6.89	37.3	1.63	-.01	SANDY SILT to CLAYEY SILT	15
2.250	7.38	44.2	1.16	-.01	SILTY SAND to SANDY SILT	15
2.400	7.87	38.1	1.23	-.01	SILTY SAND to SANDY SILT	13
2.550	8.37	44.2	1.00	-.01	SILTY SAND to SANDY SILT	15
2.700	8.86	40.0	1.60	-.02	SILTY SAND to SANDY SILT	13
2.850	9.35	21.4	2.24	-.03	CLAYEY SILT to SILTY CLAY	11
3.000	9.84	24.8	1.98	-.03	SANDY SILT to CLAYEY SILT	10
3.150	10.33	8.5	1.29	-.03	CLAYEY SILT to SILTY CLAY	4
3.300	10.83	20.5	1.47	-.01	SANDY SILT to CLAYEY SILT	8
3.450	11.32	36.9	1.76	.02	SANDY SILT to CLAYEY SILT	15
3.600	11.81	66.3	1.09	.04	SILTY SAND to SANDY SILT	22
3.750	12.30	62.8	1.56	.05	SILTY SAND to SANDY SILT	21
3.900	12.80	45.3	1.70	.05	SILTY SAND to SANDY SILT	15
4.050	13.29	37.4	2.00	.06	SANDY SILT to CLAYEY SILT	15
4.200	13.78	103.7	.48	.09	SAND to SILTY SAND	26
4.350	14.27	72.1	1.14	.09	SILTY SAND to SANDY SILT	24
4.500	14.76	8.6	4.07	.07	CLAY	9
4.650	15.26	19.7	1.17	.08	SANDY SILT to CLAYEY SILT	8
4.800	15.75	20.0	1.15	.09	SANDY SILT to CLAYEY SILT	8
4.950	16.24	18.7	1.92	.11	CLAYEY SILT to SILTY CLAY	9
5.100	16.73	14.4	1.73	.12	CLAYEY SILT to SILTY CLAY	7
5.250	17.22	22.1	1.13	.14	SANDY SILT to CLAYEY SILT	9
5.400	17.72	13.9	1.43	.14	CLAYEY SILT to SILTY CLAY	7
5.550	18.21	9.2	2.61	.15	CLAY to SILTY CLAY	6
5.700	18.70	17.6	1.82	.19	CLAYEY SILT to SILTY CLAY	9
5.850	19.19	17.3	2.42	.20	CLAYEY SILT to SILTY CLAY	9
6.000	19.69	13.3	1.36	.21	CLAYEY SILT to SILTY CLAY	7
6.150	20.18	10.9	2.11	.22	CLAYEY SILT to SILTY CLAY	5

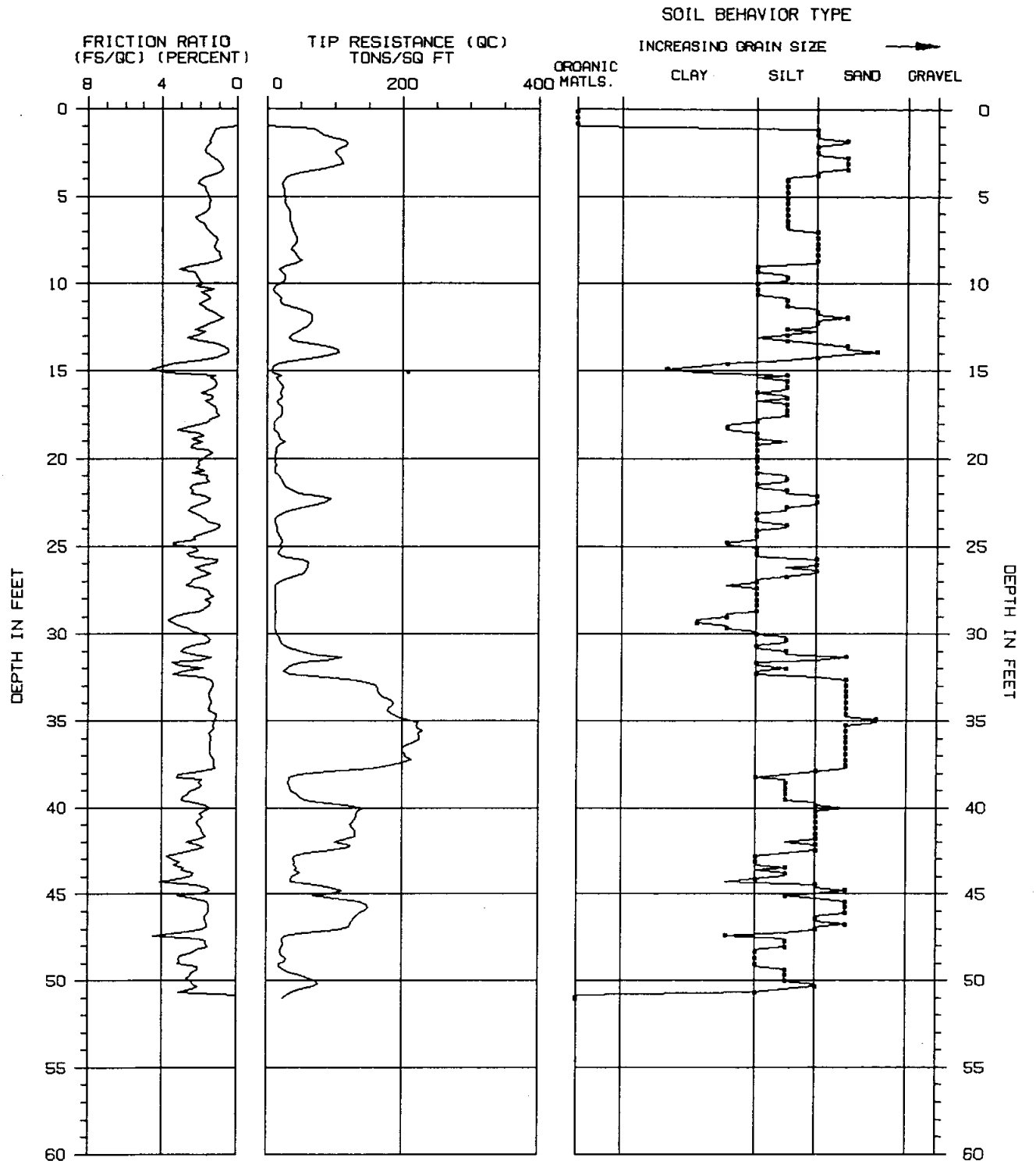
TOP 1.0 ft IS DISTURBED SOIL
*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-4

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
6.300	20.67	11.2	1.78	.23	CLAYEY SILT to SILTY CLAY	6
6.450	21.16	20.0	1.65	.24	SANDY SILT to CLAYEY SILT	8
6.600	21.65	28.2	2.52	.26	CLAYEY SILT to SILTY CLAY	14
6.750	22.15	73.7	1.75	.31	SILTY SAND to SANDY SILT	25
6.900	22.64	73.7	2.06	.33	SILTY SAND to SANDY SILT	25
7.050	23.13	21.7	2.22	.32	CLAYEY SILT to SILTY CLAY	11
7.200	23.62	10.6	1.61	.32	CLAYEY SILT to SILTY CLAY	5
7.350	24.11	14.0	1.36	.33	CLAYEY SILT to SILTY CLAY	7
7.500	24.61	22.0	2.27	.34	CLAYEY SILT to SILTY CLAY	11
7.650	25.10	22.2	2.26	.36	CLAYEY SILT to SILTY CLAY	11
7.800	25.59	21.7	2.53	.37	CLAYEY SILT to SILTY CLAY	11
7.950	26.08	60.1	1.86	.39	SILTY SAND to SANDY SILT	20
8.100	26.57	54.3	1.44	.40	SILTY SAND to SANDY SILT	18
8.250	27.07	17.3	2.48	.39	CLAYEY SILT to SILTY CLAY	9
8.400	27.56	11.0	1.55	.40	CLAYEY SILT to SILTY CLAY	5
8.550	28.05	10.6	1.70	.41	CLAYEY SILT to SILTY CLAY	5
8.700	28.54	11.2	1.79	.46	CLAYEY SILT to SILTY CLAY	6
8.850	29.04	11.2	3.38	.48	CLAY to SILTY CLAY	7
9.000	29.53	10.6	3.11	.48	CLAY to SILTY CLAY	7
9.150	30.02	14.3	1.75	.50	CLAYEY SILT to SILTY CLAY	7
9.300	30.51	20.2	1.59	.52	SANDY SILT to CLAYEY SILT	8
9.450	31.00	49.0	3.02	.57	SANDY SILT to CLAYEY SILT	20
9.600	31.50	87.3	2.02	.63	SILTY SAND to SANDY SILT	29
9.750	31.99	29.9	1.84	.62	SANDY SILT to CLAYEY SILT	12
9.900	32.48	85.2	1.84	.67	SILTY SAND to SANDY SILT	28
10.050	32.97	160.4	1.31	.74	SAND to SILTY SAND	40
10.200	33.46	165.6	1.49	.76	SAND to SILTY SAND	41
10.350	33.96	186.3	1.40	.79	SAND to SILTY SAND	47
10.500	34.45	178.5	1.53	.80	SAND to SILTY SAND	45
10.650	34.94	209.5	1.18	.79	SAND	42
10.800	35.43	224.5	1.27	.80	SAND to SILTY SAND	56
10.950	35.93	225.0	1.40	.83	SAND to SILTY SAND	56
11.100	36.42	204.6	1.48	.84	SAND to SILTY SAND	51
11.250	36.91	205.0	1.47	.84	SAND to SILTY SAND	51
11.400	37.40	200.7	1.25	.84	SAND to SILTY SAND	50
11.550	37.89	92.2	2.01	.81	SILTY SAND to SANDY SILT	31
11.700	38.39	33.6	1.90	.82	SANDY SILT to CLAYEY SILT	13
11.850	38.88	35.0	2.08	1.00	SANDY SILT to CLAYEY SILT	14
12.000	39.37	49.6	2.88	1.20	SANDY SILT to CLAYEY SILT	20
12.150	39.86	115.7	1.66	1.44	SILTY SAND to SANDY SILT	39
12.300	40.35	131.8	1.98	1.51	SILTY SAND to SANDY SILT	44
12.450	40.85	126.2	2.16	1.55	SILTY SAND to SANDY SILT	42
12.600	41.34	131.0	1.89	1.59	SILTY SAND to SANDY SILT	44
12.750	41.83	116.6	2.08	1.53	SILTY SAND to SANDY SILT	39
12.900	42.32	122.5	1.80	1.59	SILTY SAND to SANDY SILT	41
13.050	42.81	41.8	3.75	1.53	CLAYEY SILT to SILTY CLAY	21
13.200	43.31	41.2	3.40	1.60	CLAYEY SILT to SILTY CLAY	21
13.350	43.80	49.0	2.29	1.68	SANDY SILT to CLAYEY SILT	20
13.500	44.29	36.3	4.10	1.77	CLAY to SILTY CLAY	24
13.650	44.78	111.3	1.45	1.95	SAND to SILTY SAND	28

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

ASSUMED TOTAL UNIT WT = 115 PCF

ASSUMED DEPTH OF WATER TABLE = 43.0 FT

SOIL BEHAVIOR TYPE INTERPRETATIONS BASED ON: GUIDELINES FOR GEOTECHNICAL DESIGN USING THE CPT AND CPTU. SOIL MECHANICS SERIES #120. UNIVERSITY OF BRITISH COLUMBIA. SEPTEMBER 1989. BY P.K. ROBERTSON AND R.G. CAMPANELLA.

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-4

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-01-98 16:57

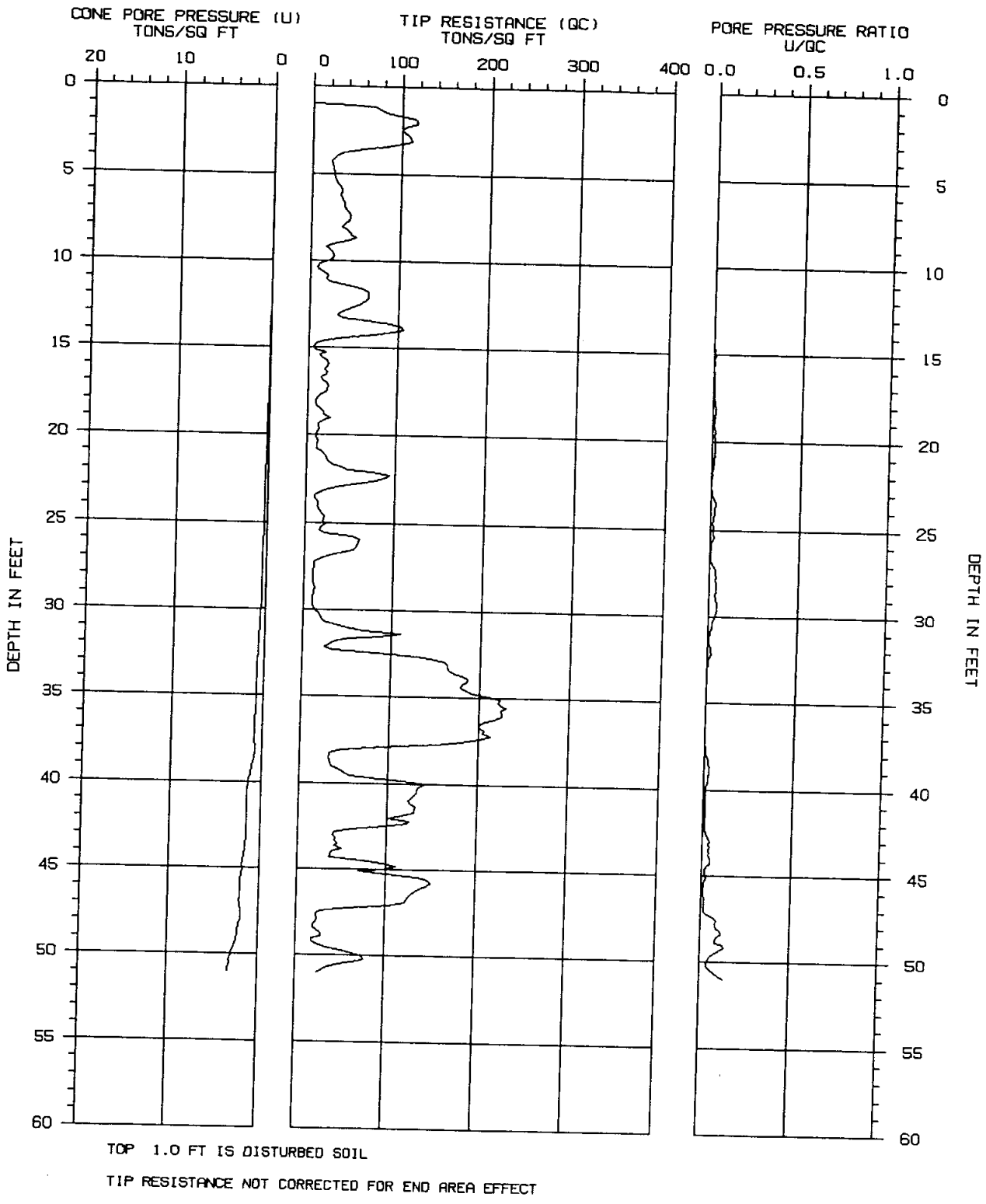
HFA

SOUNDING : CPT-4

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
13.800	45.28	101.6	2.23	1.99	SILTY SAND to SANDY SILT	34
13.950	45.77	149.6	1.49	2.10	SAND to SILTY SAND	37
14.100	46.26	132.8	1.70	2.13	SILTY SAND to SANDY SILT	44
14.250	46.75	123.1	1.60	2.15	SAND to SILTY SAND	31
14.400	47.24	58.5	3.13	2.09	SANDY SILT to CLAYEY SILT	23
14.550	47.74	23.1	1.65	1.99	SANDY SILT to CLAYEY SILT	9
14.700	48.23	19.4	2.16	2.23	CLAYEY SILT to SILTY CLAY	10
14.850	48.72	28.2	3.08	2.33	CLAYEY SILT to SILTY CLAY	14
15.000	49.21	18.0	2.11	2.47	CLAYEY SILT to SILTY CLAY	9
15.150	49.70	50.8	2.46	2.82	SANDY SILT to CLAYEY SILT	20
15.300	50.20	76.5	2.33	3.12	SILTY SAND to SANDY SILT	25
15.450	50.69	37.0	3.10	3.18	CLAYEY SILT to SILTY CLAY	19

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

Interpretations based on: Robertson and Campanella, 1989.



CONE PENETRATION TEST

SOUNDING NUMBER: CPT-4

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-01-98 16:57

HFA

CONE PENETRATION TEST

SOUNDING : CPT-5 PROJECT No.: 98-E623
PROJECT : EKI/WEBB CONE/RIG : 473/R#3 KC/MR
DATE/TIME: 10-01-98 13:31

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
.150	.49	.0	.00	.00		0
.300	.98	.0	.00	.00		0
.450	1.48	44.6	1.21	.05	SILTY SAND to SANDY SILT	15
.600	1.97	80.2	.71	.05	SAND to SILTY SAND	20
.750	2.46	78.1	.81	.04	SAND to SILTY SAND	20
.900	2.95	79.6	.67	.04	SAND to SILTY SAND	20
1.050	3.44	25.2	1.03	.02	SANDY SILT to CLAYEY SILT	10
1.200	3.94	14.6	1.51	.02	CLAYEY SILT to SILTY CLAY	7
1.350	4.43	17.0	1.24	.01	SANDY SILT to CLAYEY SILT	7
1.500	4.92	16.8	1.25	.01	SANDY SILT to CLAYEY SILT	7
1.650	5.41	23.3	1.07	-.02	SANDY SILT to CLAYEY SILT	9
1.800	5.91	38.6	.91	-.02	SILTY SAND to SANDY SILT	13
1.950	6.40	41.5	.97	-.01	SILTY SAND to SANDY SILT	14
2.100	6.89	47.3	.95	-.02	SILTY SAND to SANDY SILT	16
2.250	7.38	50.7	.99	-.02	SILTY SAND to SANDY SILT	17
2.400	7.87	71.8	.89	-.01	SAND to SILTY SAND	18
2.550	8.37	48.5	1.13	-.01	SILTY SAND to SANDY SILT	16
2.700	8.86	24.8	1.98	-.04	SANDY SILT to CLAYEY SILT	10
2.850	9.35	24.4	1.47	-.04	SANDY SILT to CLAYEY SILT	10
3.000	9.84	13.3	2.19	-.03	CLAYEY SILT to SILTY CLAY	7
3.150	10.33	16.3	2.34	-.01	CLAYEY SILT to SILTY CLAY	8
3.300	10.83	8.5	3.18	.01	CLAY	9
3.450	11.32	21.4	3.04	.07	CLAYEY SILT to SILTY CLAY	11
3.600	11.81	17.0	3.59	.12	CLAY to SILTY CLAY	11
3.750	12.30	26.4	2.39	.17	CLAYEY SILT to SILTY CLAY	13
3.900	12.80	66.5	.93	.24	SAND to SILTY SAND	17
4.050	13.29	71.2	.76	.25	SAND to SILTY SAND	18
4.200	13.78	25.4	2.20	.23	SANDY SILT to CLAYEY SILT	10
4.350	14.27	6.2	3.86	.20	CLAY	6
4.500	14.76	62.5	1.58	.27	SILTY SAND to SANDY SILT	21
4.650	15.26	47.4	1.83	.37	SILTY SAND to SANDY SILT	16
4.800	15.75	15.6	2.18	.37	CLAYEY SILT to SILTY CLAY	8
4.950	16.24	17.1	2.33	.42	CLAYEY SILT to SILTY CLAY	9
5.100	16.73	19.8	1.87	.45	SANDY SILT to CLAYEY SILT	8
5.250	17.22	19.7	1.83	.48	SANDY SILT to CLAYEY SILT	8
5.400	17.72	19.4	2.06	.50	CLAYEY SILT to SILTY CLAY	10
5.550	18.21	26.3	2.13	.53	SANDY SILT to CLAYEY SILT	11
5.700	18.70	37.4	1.23	.59	SILTY SAND to SANDY SILT	12
5.850	19.19	17.5	2.11	.58	CLAYEY SILT to SILTY CLAY	9
6.000	19.69	31.2	1.95	.60	SANDY SILT to CLAYEY SILT	12
6.150	20.18	16.0	2.07	.60	CLAYEY SILT to SILTY CLAY	8

TOP 1.0 ft IS DISTURBED SOIL
*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

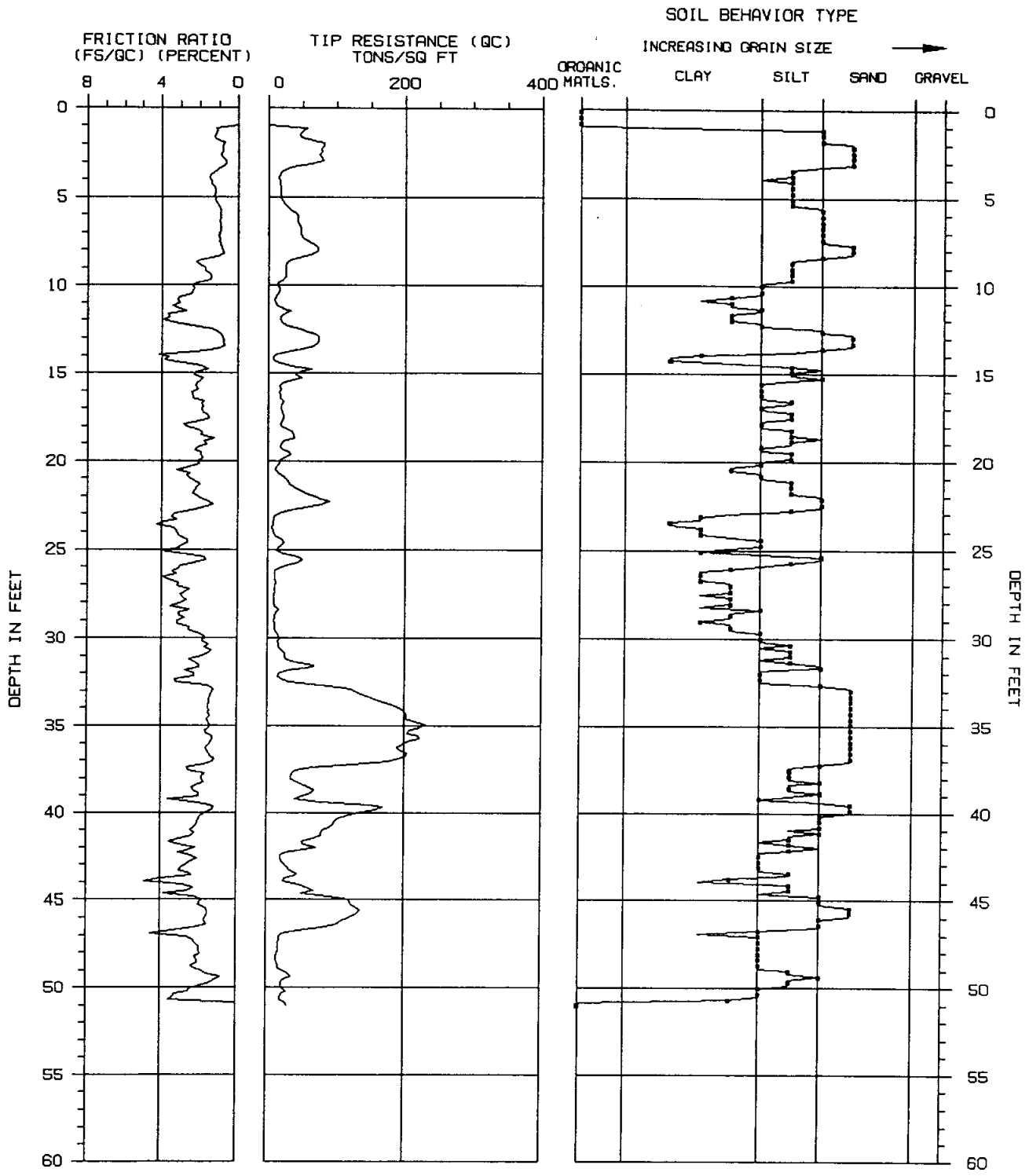
SOUNDING : CPT-5

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
6.300	20.67	14.4	2.51	.61	CLAYEY SILT to SILTY CLAY	7
6.450	21.16	28.1	2.24	.65	SANDY SILT to CLAYEY SILT	11
6.600	21.65	44.7	2.26	.72	SANDY SILT to CLAYEY SILT	18
6.750	22.15	72.8	1.94	.80	SILTY SAND to SANDY SILT	24
6.900	22.64	54.3	1.84	.84	SILTY SAND to SANDY SILT	18
7.050	23.13	8.6	3.50	.78	CLAY	9
7.200	23.62	6.1	4.25	.78	CLAY	6
7.350	24.11	8.5	3.18	.79	CLAY	8
7.500	24.61	23.5	2.60	.81	CLAYEY SILT to SILTY CLAY	12
7.650	25.10	11.9	4.03	.89	CLAY	12
7.800	25.59	49.8	1.69	.99	SILTY SAND to SANDY SILT	17
7.950	26.08	14.7	3.12	.95	CLAY to SILTY CLAY	10
8.100	26.57	9.0	3.89	.98	CLAY	9
8.250	27.07	9.5	3.16	1.02	CLAY to SILTY CLAY	6
8.400	27.56	8.0	3.00	1.07	CLAY	8
8.550	28.05	8.5	3.05	1.12	CLAY to SILTY CLAY	6
8.700	28.54	10.9	3.11	1.27	CLAY to SILTY CLAY	7
8.850	29.04	8.8	3.18	1.32	CLAY	9
9.000	29.53	9.8	2.56	1.38	CLAY to SILTY CLAY	7
9.150	30.02	16.7	1.79	1.48	CLAYEY SILT to SILTY CLAY	8
9.300	30.51	15.0	1.73	1.59	CLAYEY SILT to SILTY CLAY	8
9.450	31.00	23.8	1.89	1.77	SANDY SILT to CLAYEY SILT	10
9.600	31.50	67.1	2.01	2.15	SILTY SAND to SANDY SILT	22
9.750	31.99	17.3	2.26	2.06	CLAYEY SILT to SILTY CLAY	9
9.900	32.48	31.3	3.20	2.22	CLAYEY SILT to SILTY CLAY	16
10.050	32.97	125.4	1.27	2.65	SAND to SILTY SAND	31
10.200	33.46	155.9	1.47	2.66	SAND to SILTY SAND	39
10.350	33.96	192.3	1.50	2.79	SAND to SILTY SAND	48
10.500	34.45	202.9	1.39	2.77	SAND to SILTY SAND	51
10.650	34.94	231.1	1.39	2.46	SAND to SILTY SAND	58
10.800	35.43	205.4	1.58	2.42	SAND to SILTY SAND	51
10.950	35.93	204.0	1.36	2.44	SAND to SILTY SAND	51
11.100	36.42	194.4	1.56	2.40	SAND to SILTY SAND	49
11.250	36.91	193.3	1.20	2.40	SAND to SILTY SAND	48
11.400	37.40	66.1	2.65	2.10	SANDY SILT to CLAYEY SILT	26
11.550	37.89	34.3	1.84	1.85	SANDY SILT to CLAYEY SILT	14
11.700	38.39	50.1	1.98	2.81	SANDY SILT to CLAYEY SILT	20
11.850	38.88	63.7	1.98	3.85	SILTY SAND to SANDY SILT	21
12.000	39.37	77.3	2.33	5.15	SILTY SAND to SANDY SILT	26
12.150	39.86	158.1	1.27	6.78	SAND to SILTY SAND	40
12.300	40.35	103.3	2.01	6.43	SILTY SAND to SANDY SILT	34
12.450	40.85	91.1	2.26	6.98	SILTY SAND to SANDY SILT	30
12.600	41.34	78.6	2.38	7.53	SANDY SILT to CLAYEY SILT	31
12.750	41.83	53.4	2.98	4.88	SANDY SILT to CLAYEY SILT	21
12.900	42.32	28.5	3.05	4.87	CLAYEY SILT to SILTY CLAY	14
13.050	42.81	22.0	2.41	5.27	CLAYEY SILT to SILTY CLAY	11
13.200	43.31	33.4	2.99	6.33	CLAYEY SILT to SILTY CLAY	17
13.350	43.80	26.6	4.02	6.78	CLAY to SILTY CLAY	18
13.500	44.29	58.5	2.24	8.82	SANDY SILT to CLAYEY SILT	23
13.650	44.78	90.8	2.23	6.85	SILTY SAND to SANDY SILT	30

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

ASSUMED TOTAL UNIT WT = 115 PCF

ASSUMED DEPTH OF WATER TABLE = 43.0 FT

SOIL BEHAVIOR TYPE INTERPRETATIONS BASED ON: GUIDELINES FOR GEOTECHNICAL DESIGN USING THE CPT AND CPTU. SOIL MECHANICS SERIES #120. UNIVERSITY OF BRITISH COLUMBIA, SEPTEMBER 1989. BY P.K. ROBERTSON AND R.G. CAMPANELLA.

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-5

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-01-98 13:31

HFA

000958

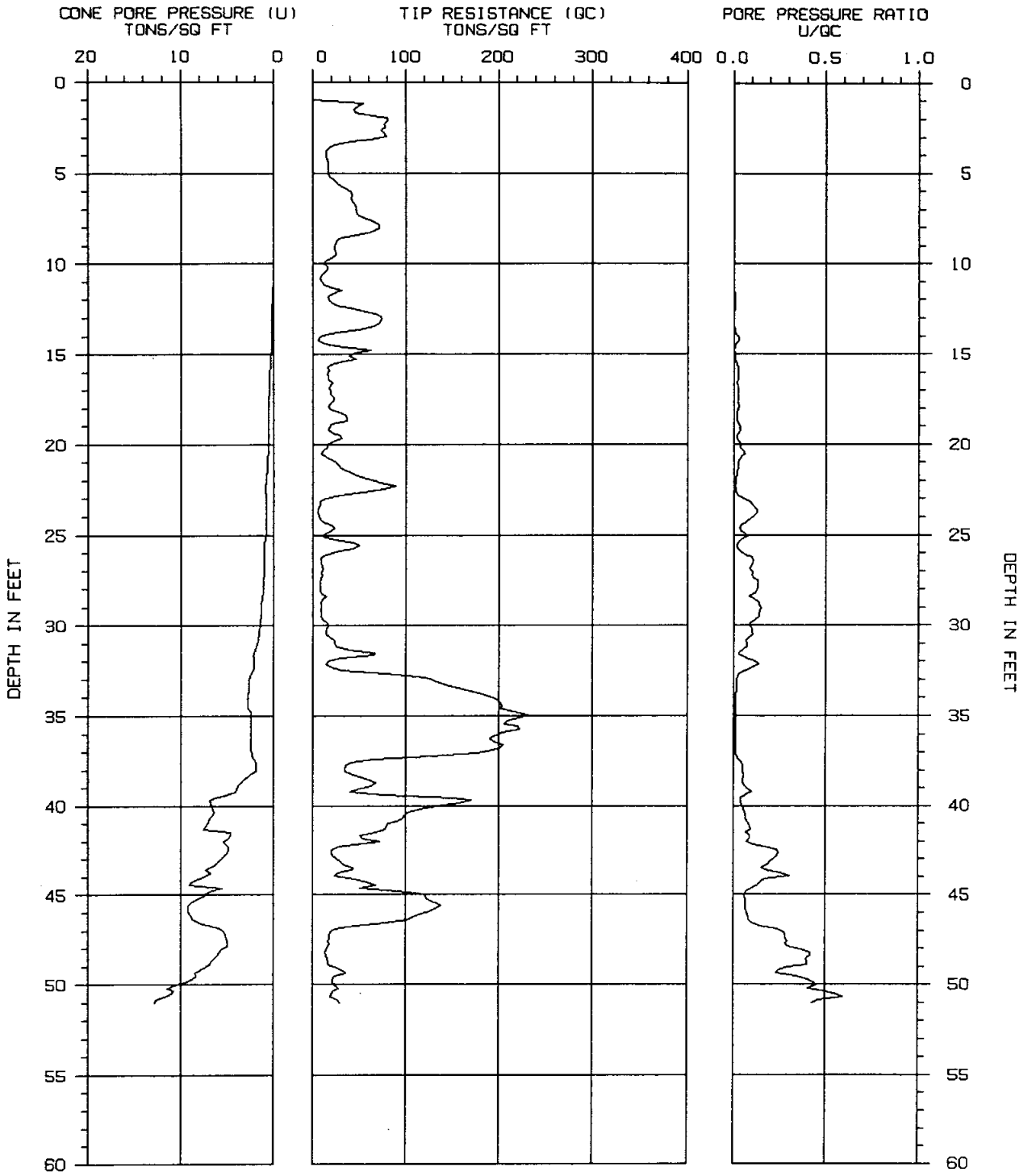
SOUNDING : CPT-5

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
13.800	45.28	123.1	1.98	8.34	SILTY SAND to SANDY SILT	41
13.950	45.77	132.6	1.49	9.24	SAND to SILTY SAND	33
14.100	46.26	105.9	1.62	8.74	SILTY SAND to SANDY SILT	35
14.250	46.75	46.3	3.35	6.73	CLAYEY SILT to SILTY CLAY	23
14.400	47.24	18.1	2.26	5.17	CLAYEY SILT to SILTY CLAY	9
14.550	47.74	17.6	1.93	4.99	CLAYEY SILT to SILTY CLAY	9
14.700	48.23	14.0	2.15	5.83	CLAYEY SILT to SILTY CLAY	7
14.850	48.72	16.7	2.34	6.70	CLAYEY SILT to SILTY CLAY	8
15.000	49.21	31.1	1.58	7.82	SANDY SILT to CLAYEY SILT	12
15.150	49.70	21.9	1.32	8.79	SANDY SILT to CLAYEY SILT	9
15.300	50.20	28.2	2.52	11.41	CLAYEY SILT to SILTY CLAY	14
15.450	50.69	19.8	3.54	11.76	CLAY to SILTY CLAY	13

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-5

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-01-98 13:31

HFA

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
6.300	20.67	17.4	2.47	.25	CLAYEY SILT to SILTY CLAY	9
6.450	21.16	19.3	2.48	.25	CLAYEY SILT to SILTY CLAY	10
6.600	21.65	18.7	1.55	.26	SANDY SILT to CLAYEY SILT	7
6.750	22.15	12.6	2.06	.27	CLAYEY SILT to SILTY CLAY	6
6.900	22.64	21.4	2.85	.28	CLAYEY SILT to SILTY CLAY	11
7.050	23.13	63.9	2.30	.30	SANDY SILT to CLAYEY SILT	26
7.200	23.62	13.5	2.15	.29	CLAYEY SILT to SILTY CLAY	7
7.350	24.11	15.6	1.60	.30	CLAYEY SILT to SILTY CLAY	8
7.500	24.61	19.5	2.05	.32	CLAYEY SILT to SILTY CLAY	10
7.650	25.10	77.8	1.82	.34	SILTY SAND to SANDY SILT	26
7.800	25.59	47.7	2.85	.34	SANDY SILT to CLAYEY SILT	19
7.950	26.08	76.5	2.25	.35	SILTY SAND to SANDY SILT	25
8.100	26.57	64.1	2.51	.35	SANDY SILT to CLAYEY SILT	26
8.250	27.07	18.0	3.16	.34	CLAYEY SILT to SILTY CLAY	9
8.400	27.56	13.4	3.59	.35	CLAY to SILTY CLAY	9
8.550	28.05	13.3	1.89	.35	CLAYEY SILT to SILTY CLAY	7
8.700	28.54	12.6	1.51	.38	CLAYEY SILT to SILTY CLAY	6
8.850	29.04	10.7	1.68	.39	CLAYEY SILT to SILTY CLAY	5
9.000	29.53	11.2	2.50	.39	CLAYEY SILT to SILTY CLAY	6
9.150	30.02	10.9	2.76	.40	CLAY to SILTY CLAY	7
9.300	30.51	12.5	2.08	.40	CLAYEY SILT to SILTY CLAY	6
9.450	31.00	14.6	1.24	.41	SANDY SILT to CLAYEY SILT	6
9.600	31.50	15.8	1.64	.42	CLAYEY SILT to SILTY CLAY	8
9.750	31.99	64.3	2.84	.47	SANDY SILT to CLAYEY SILT	26
9.900	32.48	25.4	2.13	.47	SANDY SILT to CLAYEY SILT	10
10.050	32.97	30.3	3.20	.49	CLAYEY SILT to SILTY CLAY	15
10.200	33.46	102.2	1.67	.52	SILTY SAND to SANDY SILT	34
10.350	33.96	116.0	1.84	.55	SILTY SAND to SANDY SILT	39
10.500	34.45	113.2	1.86	.57	SILTY SAND to SANDY SILT	38
10.650	34.94	140.8	1.86	.60	SILTY SAND to SANDY SILT	47
10.800	35.43	197.7	1.61	.70	SAND to SILTY SAND	49
10.950	35.93	210.8	1.84	.77	SAND to SILTY SAND	53
11.100	36.42	226.7	1.86	.83	SAND to SILTY SAND	57
11.250	36.91	236.3	1.60	.90	SAND to SILTY SAND	59
11.400	37.40	268.9	1.60	.93	SAND to SILTY SAND	67
11.550	37.89	245.1	1.20	.94	SAND	49
11.700	38.39	184.6	1.41	.90	SAND to SILTY SAND	46
11.850	38.88	69.2	2.40	.86	SANDY SILT to CLAYEY SILT	28
12.000	39.37	28.9	1.14	.86	SILTY SAND to SANDY SILT	10
12.150	39.86	31.2	1.67	1.08	SANDY SILT to CLAYEY SILT	12
12.300	40.35	68.8	2.56	1.34	SANDY SILT to CLAYEY SILT	28
12.450	40.85	114.8	1.96	1.48	SILTY SAND to SANDY SILT	38
12.600	41.34	173.7	1.43	1.59	SAND to SILTY SAND	43
12.750	41.83	137.6	1.90	1.61	SILTY SAND to SANDY SILT	46
12.900	42.32	99.9	2.08	1.59	SILTY SAND to SANDY SILT	33
13.050	42.81	79.6	2.45	1.59	SANDY SILT to CLAYEY SILT	32
13.200	43.31	38.7	3.43	1.61	CLAYEY SILT to SILTY CLAY	19
13.350	43.80	53.3	2.87	1.70	SANDY SILT to CLAYEY SILT	21
13.500	44.29	48.6	2.53	1.75	SANDY SILT to CLAYEY SILT	19
13.650	44.78	49.9	3.04	1.86	SANDY SILT to CLAYEY SILT	20

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

Interpretations based on: Robertson and Campanella, 1989.

HOLGUIN, FAHAN & ASSOCIATES, INC.

CONE PENETRATION TEST

SOUNDING : CPT-6
PROJECT : EKI/WEBB
DATE/TIME: 10-02-98 09:35

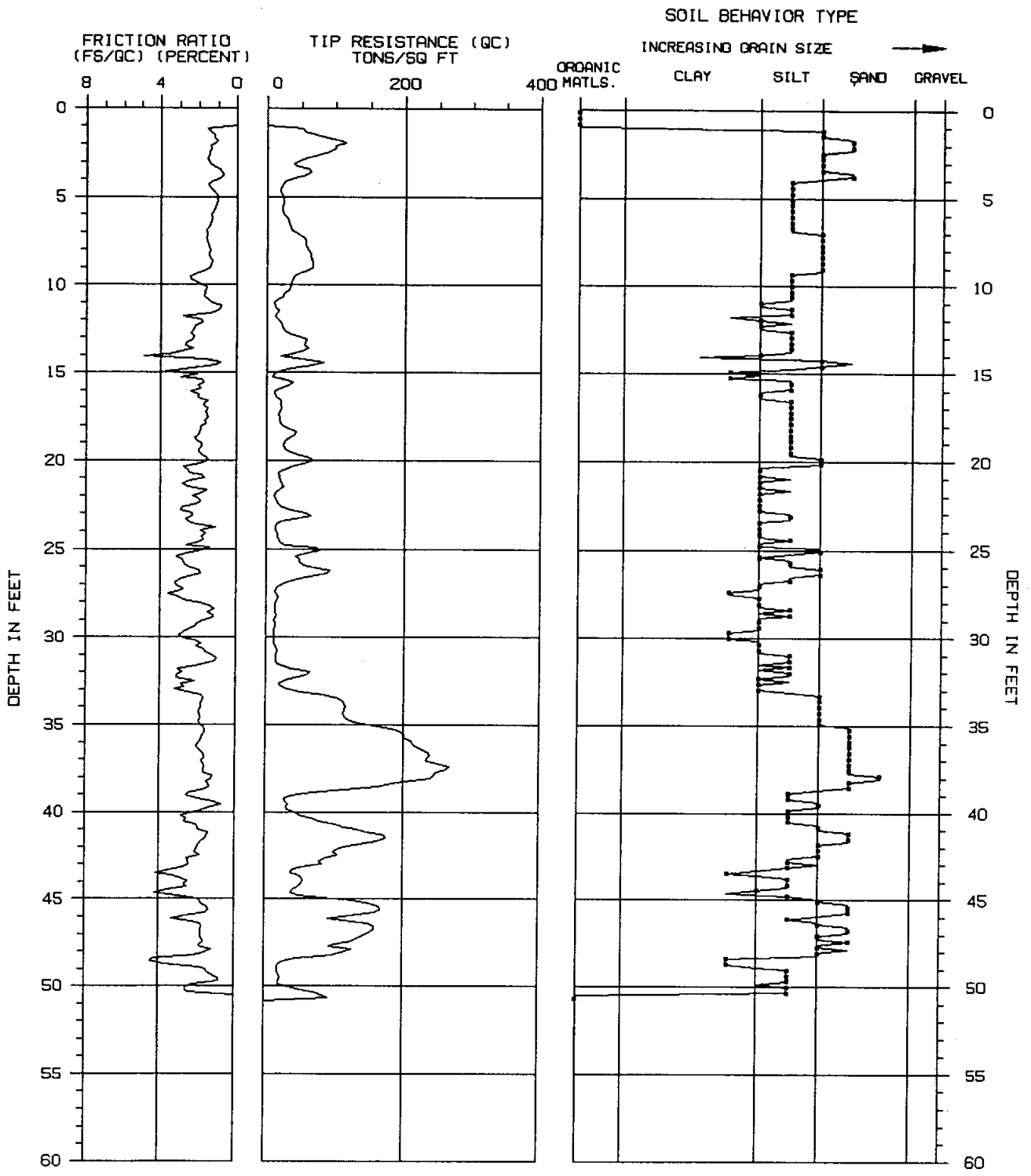
PROJECT No.: 98-E623
CONE/RIG : 473/R#3 KC/MR

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
.150	.49	.0	.00	.00		0
.300	.98	.0	.00	.00		0
.450	1.48	70.9	1.21	.04	SILTY SAND to SANDY SILT	24
.600	1.97	113.5	1.15	.06	SAND to SILTY SAND	28
.750	2.46	90.0	1.43	.06	SILTY SAND to SANDY SILT	30
.900	2.95	45.1	1.53	.05	SILTY SAND to SANDY SILT	15
1.050	3.44	59.7	.90	.05	SILTY SAND to SANDY SILT	20
1.200	3.94	39.8	.85	.05	SILTY SAND to SANDY SILT	13
1.350	4.43	20.4	1.47	.04	SANDY SILT to CLAYEY SILT	8
1.500	4.92	21.4	1.03	.03	SANDY SILT to CLAYEY SILT	9
1.650	5.41	23.0	1.09	.01	SANDY SILT to CLAYEY SILT	9
1.800	5.91	22.3	1.30	.01	SANDY SILT to CLAYEY SILT	9
1.950	6.40	30.9	1.33	.01	SANDY SILT to CLAYEY SILT	12
2.100	6.89	35.3	1.61	.01	SANDY SILT to CLAYEY SILT	14
2.250	7.38	53.3	1.61	.01	SILTY SAND to SANDY SILT	18
2.400	7.87	57.0	1.44	.01	SILTY SAND to SANDY SILT	19
2.550	8.37	63.6	1.45	.01	SILTY SAND to SANDY SILT	21
2.700	8.86	65.3	1.36	.00	SILTY SAND to SANDY SILT	22
2.850	9.35	45.6	2.13	.00	SANDY SILT to CLAYEY SILT	18
3.000	9.84	35.3	2.07	.01	SANDY SILT to CLAYEY SILT	14
3.150	10.33	30.9	1.65	.01	SANDY SILT to CLAYEY SILT	12
3.300	10.83	15.2	1.51	.01	SANDY SILT to CLAYEY SILT	6
3.450	11.32	12.5	.88	.02	SANDY SILT to CLAYEY SILT	5
3.600	11.81	10.9	2.84	.02	CLAY to SILTY CLAY	7
3.750	12.30	20.8	2.17	.03	CLAYEY SILT to SILTY CLAY	10
3.900	12.80	30.6	2.42	.03	SANDY SILT to CLAYEY SILT	12
4.050	13.29	55.8	2.60	.04	SANDY SILT to CLAYEY SILT	22
4.200	13.78	49.3	2.92	.05	SANDY SILT to CLAYEY SILT	20
4.350	14.27	50.5	1.66	.05	SILTY SAND to SANDY SILT	17
4.500	14.76	36.0	2.39	.05	SANDY SILT to CLAYEY SILT	14
4.650	15.26	8.8	2.97	.05	CLAY to SILTY CLAY	6
4.800	15.75	32.0	2.03	.19	SANDY SILT to CLAYEY SILT	13
4.950	16.24	11.6	1.98	.19	CLAYEY SILT to SILTY CLAY	6
5.100	16.73	20.1	1.64	.20	SANDY SILT to CLAYEY SILT	8
5.250	17.22	18.9	1.64	.21	SANDY SILT to CLAYEY SILT	8
5.400	17.72	18.4	1.68	.21	SANDY SILT to CLAYEY SILT	7
5.550	18.21	30.0	1.87	.22	SANDY SILT to CLAYEY SILT	12
5.700	18.70	33.7	2.19	.22	SANDY SILT to CLAYEY SILT	13
5.850	19.19	24.2	1.82	.23	SANDY SILT to CLAYEY SILT	10
6.000	19.69	45.1	1.84	.24	SANDY SILT to CLAYEY SILT	18
6.150	20.18	54.7	1.92	.25	SILTY SAND to SANDY SILT	18

TOP 1.0 ft IS DISTURBED SOIL
*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

ASSUMED TOTAL UNIT WT = 115 PCF

ASSUMED DEPTH OF WATER TABLE = 43.0 FT

SOIL BEHAVIOR TYPE INTERPRETATIONS BASED ON: GUIDELINES FOR GEOTECHNICAL DESIGN USING THE CPT AND CPTU. SOIL MECHANICS SERIES #120, UNIVERSITY OF BRITISH COLUMBIA, SEPTEMBER 1989, BY P.K. ROBERTSON AND R.G. CAMPANELLA.

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-6

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-02-98 09:35

HFA

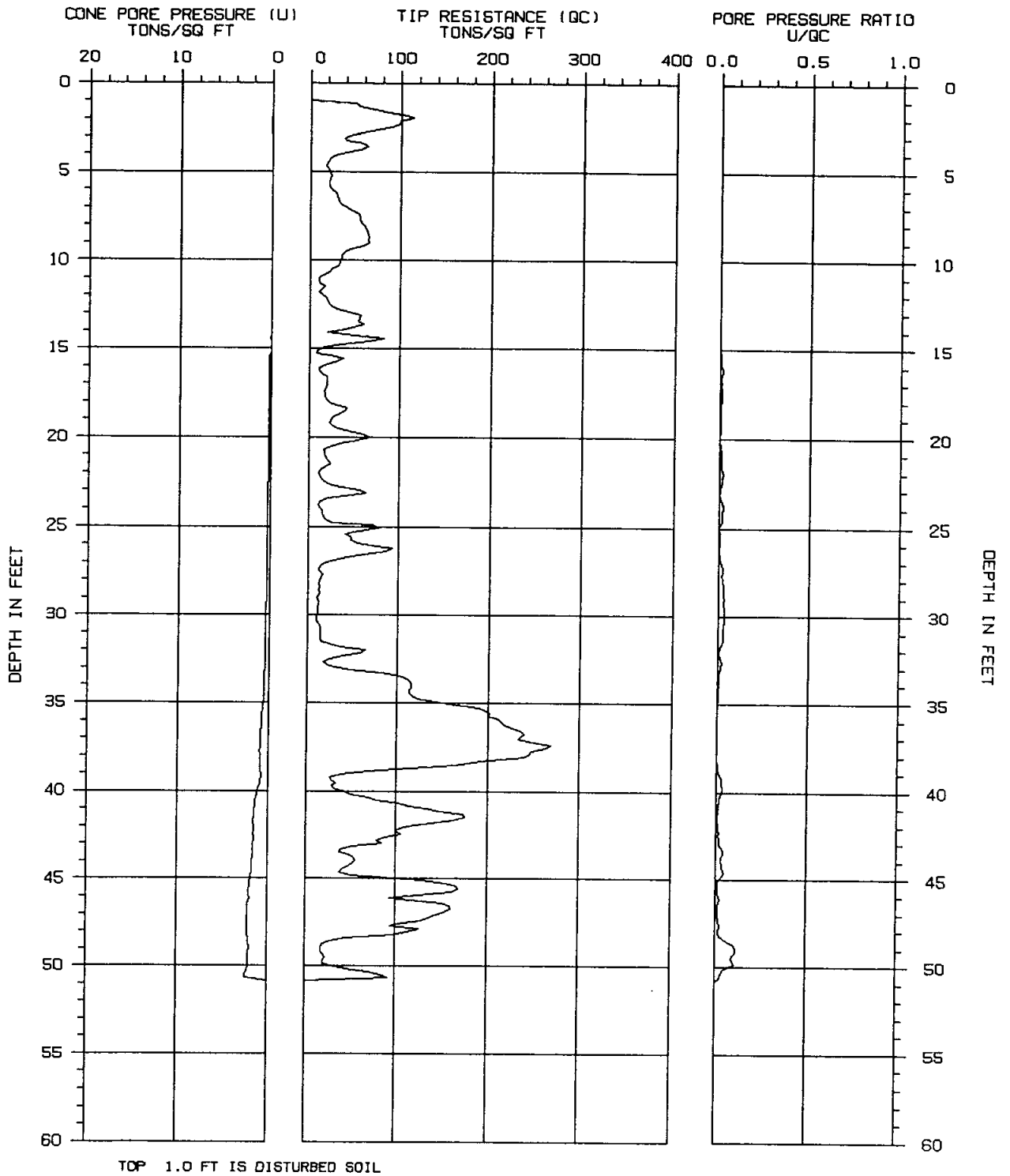
SOUNDING : CPT-6

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
13.800	45.28	153.6	1.71	2.02	SAND to SILTY SAND	38
13.950	45.77	160.2	1.50	2.07	SAND to SILTY SAND	40
14.100	46.26	128.1	2.24	2.16	SILTY SAND to SANDY SILT	43
14.250	46.75	159.5	1.77	2.23	SAND to SILTY SAND	40
14.400	47.24	135.4	1.73	2.25	SILTY SAND to SANDY SILT	45
14.550	47.74	94.4	1.82	2.22	SILTY SAND to SANDY SILT	31
14.700	48.23	97.8	2.12	2.19	SILTY SAND to SANDY SILT	33
14.850	48.72	20.0	3.69	2.05	CLAY to SILTY CLAY	13
15.000	49.21	18.3	1.42	2.05	SANDY SILT to CLAYEY SILT	7
15.150	49.70	20.3	.84	2.09	SANDY SILT to CLAYEY SILT	8
15.300	50.20	52.0	2.58	2.23	SANDY SILT to CLAYEY SILT	21
15.450	50.69	92.8	*****	2.45		0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-6

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-02-98 09:35

HFA

CONE PENETRATION TEST

SOUNDING : CPT-7
PROJECT : EKI/WEBB
DATE/TIME: 10-02-98 07:08

PROJECT No.: 98-E623
CONE/RIG : 473/R#3 KC/MR

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
.150	.49	.0	.00	.00		0
.300	.98	.0	.00	.00		0
.450	1.48	126.5	1.19	.07	SAND to SILTY SAND	32
.600	1.97	114.9	1.14	.08	SAND to SILTY SAND	29
.750	2.46	71.9	1.17	.08	SILTY SAND to SANDY SILT	24
.900	2.95	70.8	.71	.07	SAND to SILTY SAND	18
1.050	3.44	30.7	.81	.07	SILTY SAND to SANDY SILT	10
1.200	3.94	19.7	1.17	.05	SANDY SILT to CLAYEY SILT	8
1.350	4.43	16.9	1.07	.04	SANDY SILT to CLAYEY SILT	7
1.500	4.92	23.9	.96	.03	SANDY SILT to CLAYEY SILT	10
1.650	5.41	25.9	1.77	-.01	SANDY SILT to CLAYEY SILT	10
1.800	5.91	37.0	1.41	-.01	SILTY SAND to SANDY SILT	12
1.950	6.40	40.8	1.52	-.01	SILTY SAND to SANDY SILT	14
2.100	6.89	41.3	1.53	-.01	SILTY SAND to SANDY SILT	14
2.250	7.38	50.5	1.59	-.01	SILTY SAND to SANDY SILT	17
2.400	7.87	51.2	1.23	-.00	SILTY SAND to SANDY SILT	17
2.550	8.37	25.1	1.35	-.01	SANDY SILT to CLAYEY SILT	10
2.700	8.86	17.5	1.82	-.03	CLAYEY SILT to SILTY CLAY	9
2.850	9.35	31.3	1.25	-.02	SILTY SAND to SANDY SILT	10
3.000	9.84	17.9	2.29	-.02	CLAYEY SILT to SILTY CLAY	9
3.150	10.33	11.1	2.08	-.02	CLAYEY SILT to SILTY CLAY	6
3.300	10.83	19.6	2.25	-.02	CLAYEY SILT to SILTY CLAY	10
3.450	11.32	14.1	2.48	-.02	CLAYEY SILT to SILTY CLAY	7
3.600	11.81	20.2	2.73	.00	CLAYEY SILT to SILTY CLAY	10
3.750	12.30	21.9	2.14	.00	CLAYEY SILT to SILTY CLAY	11
3.900	12.80	23.0	1.26	.01	SANDY SILT to CLAYEY SILT	9
4.050	13.29	23.6	1.74	.02	SANDY SILT to CLAYEY SILT	9
4.200	13.78	30.5	1.51	.04	SANDY SILT to CLAYEY SILT	12
4.350	14.27	8.9	1.12	.04	CLAYEY SILT to SILTY CLAY	4
4.500	14.76	13.0	1.23	.04	CLAYEY SILT to SILTY CLAY	6
4.650	15.26	47.5	1.47	.06	SILTY SAND to SANDY SILT	16
4.800	15.75	24.8	1.66	.07	SANDY SILT to CLAYEY SILT	10
4.950	16.24	28.3	1.66	.09	SANDY SILT to CLAYEY SILT	11
5.100	16.73	36.4	1.79	.10	SANDY SILT to CLAYEY SILT	15
5.250	17.22	31.0	1.61	.11	SANDY SILT to CLAYEY SILT	12
5.400	17.72	31.8	1.73	.12	SANDY SILT to CLAYEY SILT	13
5.550	18.21	40.0	1.50	.12	SILTY SAND to SANDY SILT	13
5.700	18.70	24.4	1.93	.13	SANDY SILT to CLAYEY SILT	10
5.850	19.19	36.7	1.75	.13	SANDY SILT to CLAYEY SILT	15
6.000	19.69	21.5	2.42	.14	CLAYEY SILT to SILTY CLAY	11
6.150	20.18	27.0	1.67	.14	SANDY SILT to CLAYEY SILT	11

TOP 1.0 ft IS DISTURBED SOIL
*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-7

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
6.300	20.67	15.8	1.83	.14	CLAYEY SILT to SILTY CLAY	8
6.450	21.16	13.9	1.94	.15	CLAYEY SILT to SILTY CLAY	7
6.600	21.65	32.1	1.15	.15	SILTY SAND to SANDY SILT	11
6.750	22.15	38.3	2.77	-.35	SANDY SILT to CLAYEY SILT	15
6.900	22.64	67.1	1.46	-.35	SILTY SAND to SANDY SILT	22
7.050	23.13	19.2	2.60	-.35	CLAYEY SILT to SILTY CLAY	10
7.200	23.62	15.2	2.43	-.35	CLAYEY SILT to SILTY CLAY	8
7.350	24.11	29.7	2.42	-.34	SANDY SILT to CLAYEY SILT	12
7.500	24.61	16.3	2.89	-.34	CLAYEY SILT to SILTY CLAY	8
7.650	25.10	67.1	1.19	-.33	SILTY SAND to SANDY SILT	22
7.800	25.59	60.3	1.96	-.33	SILTY SAND to SANDY SILT	20
7.950	26.08	21.4	2.76	-.33	CLAYEY SILT to SILTY CLAY	11
8.100	26.57	11.2	2.05	-.33	CLAYEY SILT to SILTY CLAY	6
8.250	27.07	13.1	1.83	-.32	CLAYEY SILT to SILTY CLAY	7
8.400	27.56	13.1	1.07	-.32	SANDY SILT to CLAYEY SILT	5
8.550	28.05	21.2	1.09	-.31	SANDY SILT to CLAYEY SILT	8
8.700	28.54	14.6	.96	-.29	SANDY SILT to CLAYEY SILT	6
8.850	29.04	10.7	1.96	-.29	CLAYEY SILT to SILTY CLAY	5
9.000	29.53	11.8	2.71	-.28	CLAY to SILTY CLAY	8
9.150	30.02	16.3	1.35	-.28	SANDY SILT to CLAYEY SILT	7
9.300	30.51	24.4	.78	-.27	SILTY SAND to SANDY SILT	8
9.450	31.00	39.6	2.22	-.26	SANDY SILT to CLAYEY SILT	16
9.600	31.50	75.6	2.78	-.25	SANDY SILT to CLAYEY SILT	30
9.750	31.99	19.7	2.79	-.24	CLAYEY SILT to SILTY CLAY	10
9.900	32.48	71.2	2.06	-.23	SILTY SAND to SANDY SILT	24
10.050	32.97	130.8	1.41	-.22	SAND to SILTY SAND	33
10.200	33.46	147.1	1.48	-.21	SAND to SILTY SAND	37
10.350	33.96	145.9	1.62	-.21	SAND to SILTY SAND	36
10.500	34.45	168.5	1.32	-.21	SAND to SILTY SAND	42
10.650	34.94	189.5	1.56	-.20	SAND to SILTY SAND	47
10.800	35.43	224.6	1.54	-.20	SAND to SILTY SAND	56
10.950	35.93	242.8	1.60	-.19	SAND to SILTY SAND	61
11.100	36.42	238.2	1.72	-.19	SAND to SILTY SAND	60
11.250	36.91	240.6	1.66	-.18	SAND to SILTY SAND	60
11.400	37.40	209.6	1.72	-.18	SAND to SILTY SAND	52
11.550	37.89	204.2	1.19	-.18	SAND to SILTY SAND	51
11.700	38.39	51.5	2.06	-.20	SANDY SILT to CLAYEY SILT	21
11.850	38.88	35.5	2.14	-.21	SANDY SILT to CLAYEY SILT	14
12.000	39.37	71.6	3.14	-.21	SANDY SILT to CLAYEY SILT	29
12.150	39.86	151.1	1.59	-.20	SAND to SILTY SAND	38
12.300	40.35	174.2	1.50	-.20	SAND to SILTY SAND	44
12.450	40.85	165.2	1.37	-.19	SAND to SILTY SAND	41
12.600	41.34	121.0	2.06	-.19	SILTY SAND to SANDY SILT	40
12.750	41.83	85.2	2.23	-.19	SILTY SAND to SANDY SILT	28
12.900	42.32	43.4	2.98	-.19	SANDY SILT to CLAYEY SILT	17
13.050	42.81	47.6	2.98	-.19	SANDY SILT to CLAYEY SILT	19
13.200	43.31	69.9	1.79	-.18	SILTY SAND to SANDY SILT	23
13.350	43.80	57.0	3.28	-.18	CLAYEY SILT to SILTY CLAY	29
13.500	44.29	148.0	1.43	-.16	SAND to SILTY SAND	37
13.650	44.78	167.4	1.37	-.15	SAND to SILTY SAND	42

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

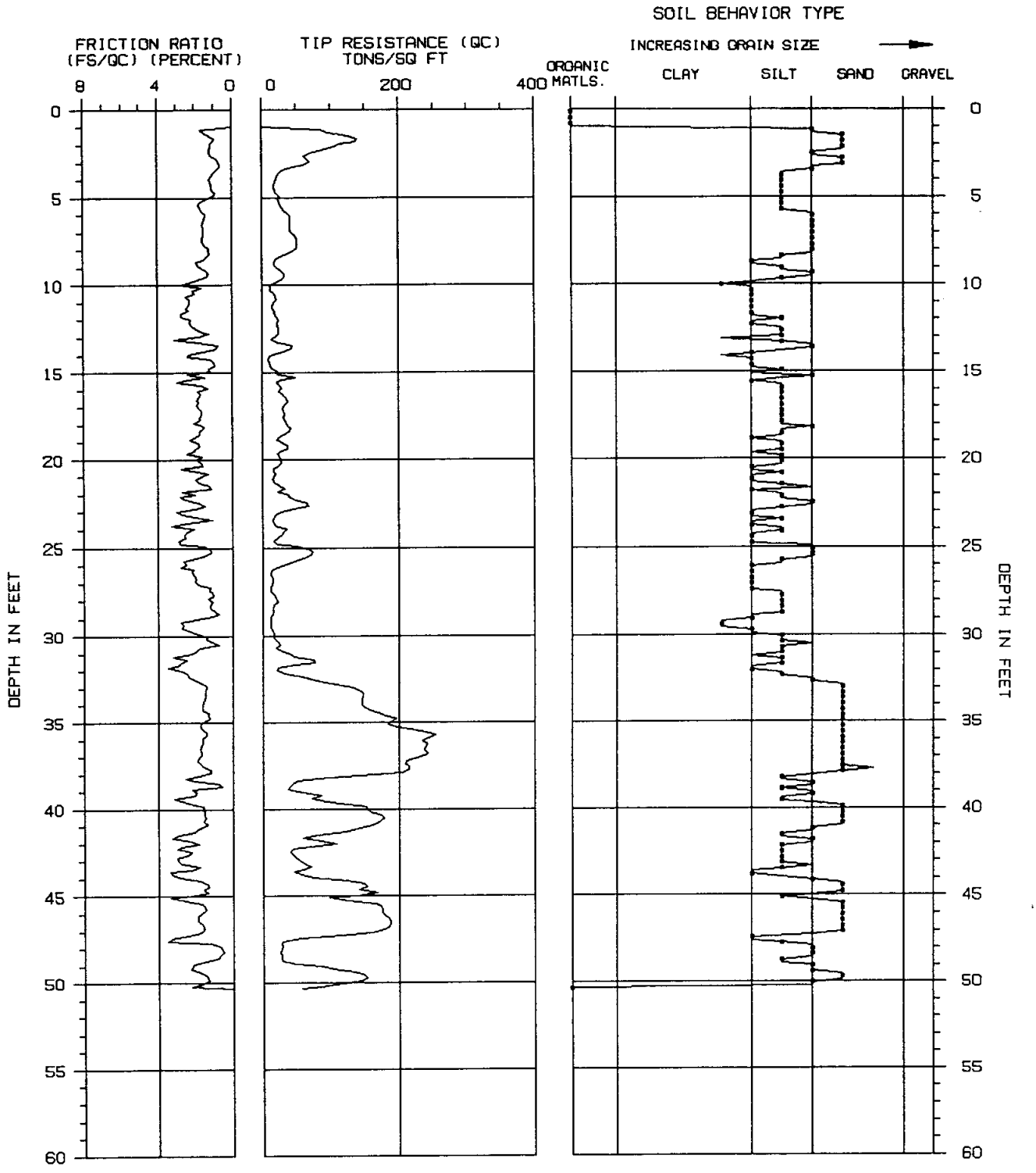
Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-7

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
13.800	45.28	124.6	2.50	-.14	SILTY SAND to SANDY SILT	42
13.950	45.77	174.8	1.48	-.13	SAND to SILTY SAND	44
14.100	46.26	185.0	1.90	-.13	SAND to SILTY SAND	46
14.250	46.75	185.1	1.58	-.12	SAND to SILTY SAND	46
14.400	47.24	113.7	2.39	-.12	SILTY SAND to SANDY SILT	38
14.550	47.74	25.4	1.18	-.12	SANDY SILT to CLAYEY SILT	10
14.700	48.23	25.1	.56	-.09	SILTY SAND to SANDY SILT	8
14.850	48.72	27.8	1.44	-.08	SANDY SILT to CLAYEY SILT	11
15.000	49.21	102.5	2.25	-.07	SILTY SAND to SANDY SILT	34
15.150	49.70	153.5	1.36	-.05	SAND to SILTY SAND	38
15.300	50.20	85.1	2.19	-.05	SILTY SAND to SANDY SILT	28

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

Interpretations based on: Robertson and Campanella, 1989.



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

ASSUMED TOTAL UNIT WT = 115 PCF

ASSUMED DEPTH OF WATER TABLE = 43.0 FT

SOIL BEHAVIOR TYPE INTERPRETATIONS BASED ON: GUIDELINES FOR GEOTECHNICAL DESIGN USING THE CPT AND CPTU. SOIL MECHANICS SERIES #120. UNIVERSITY OF BRITISH COLUMBIA. SEPTEMBER 1989. BY P.K. ROBERTSON AND R.G. CAMPANELLA.

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-7

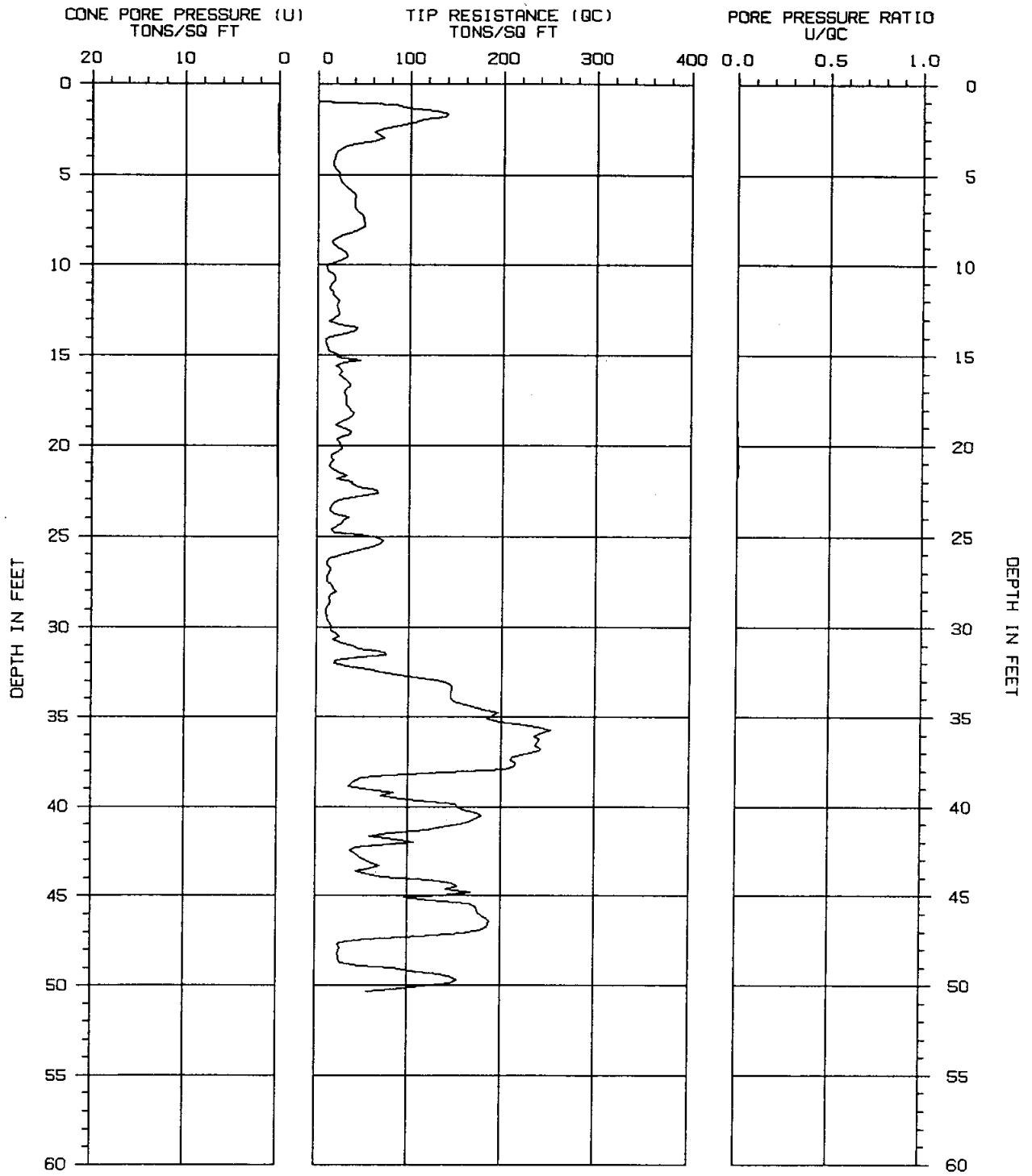
PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-02-98 07:08

HFA



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-7

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-02-98 07:08

HFA

CONE PENETRATION TEST

SOUNDING : CPT-8 PROJECT No.: 98-E623
PROJECT : EKI/WEBB CONE/RIG : 473/R#3 KC/MR
DATE/TIME: 10-02-98 11:27

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
.150	.49	.0	.00	.00		0
.300	.98	.0	.00	.00		0
.450	1.48	54.9	1.92	-.01	SILTY SAND to SANDY SILT	18
.600	1.97	45.0	1.52	-.02	SILTY SAND to SANDY SILT	15
.750	2.46	22.9	1.51	-.02	SANDY SILT to CLAYEY SILT	9
.900	2.95	18.2	1.21	-.02	SANDY SILT to CLAYEY SILT	7
1.050	3.44	18.6	1.07	-.03	SANDY SILT to CLAYEY SILT	7
1.200	3.94	16.8	1.08	-.03	SANDY SILT to CLAYEY SILT	7
1.350	4.43	16.7	1.06	-.03	SANDY SILT to CLAYEY SILT	7
1.500	4.92	17.5	.96	-.03	SANDY SILT to CLAYEY SILT	7
1.650	5.41	25.9	2.30	-.05	SANDY SILT to CLAYEY SILT	10
1.800	5.91	55.9	1.47	-.05	SILTY SAND to SANDY SILT	19
1.950	6.40	41.2	1.29	-.05	SILTY SAND to SANDY SILT	14
2.100	6.89	48.2	.94	-.06	SILTY SAND to SANDY SILT	16
2.250	7.38	58.3	.72	-.06	SAND to SILTY SAND	15
2.400	7.87	63.3	.80	-.06	SAND to SILTY SAND	16
2.550	8.37	56.7	1.96	-.06	SILTY SAND to SANDY SILT	19
2.700	8.86	39.2	2.32	-.06	SANDY SILT to CLAYEY SILT	16
2.850	9.35	30.4	1.51	-.05	SANDY SILT to CLAYEY SILT	12
3.000	9.84	23.3	1.36	-.05	SANDY SILT to CLAYEY SILT	9
3.150	10.33	26.3	1.42	-.06	SANDY SILT to CLAYEY SILT	11
3.300	10.83	72.0	1.35	-.05	SILTY SAND to SANDY SILT	24
3.450	11.32	47.8	2.03	-.04	SANDY SILT to CLAYEY SILT	19
3.600	11.81	55.2	1.87	-.05	SILTY SAND to SANDY SILT	18
3.750	12.30	67.6	1.57	-.05	SILTY SAND to SANDY SILT	23
3.900	12.80	24.1	3.53	-.05	CLAYEY SILT to SILTY CLAY	12
4.050	13.29	87.8	.82	-.04	SAND to SILTY SAND	22
4.200	13.78	66.1	1.15	-.04	SILTY SAND to SANDY SILT	22
4.350	14.27	10.0	4.04	-.04	CLAY	10
4.500	14.76	16.0	1.72	-.04	CLAYEY SILT to SILTY CLAY	8
4.650	15.26	30.4	2.57	-.02	CLAYEY SILT to SILTY CLAY	15
4.800	15.75	35.1	2.06	-.01	SANDY SILT to CLAYEY SILT	14
4.950	16.24	30.5	1.74	-.01	SANDY SILT to CLAYEY SILT	12
5.100	16.73	26.1	2.09	-.01	SANDY SILT to CLAYEY SILT	10
5.250	17.22	31.9	1.81	-.00	SANDY SILT to CLAYEY SILT	13
5.400	17.72	33.9	2.07	-.00	SANDY SILT to CLAYEY SILT	14
5.550	18.21	15.6	2.79	.00	CLAYEY SILT to SILTY CLAY	8
5.700	18.70	32.7	2.12	.01	SANDY SILT to CLAYEY SILT	13
5.850	19.19	19.0	3.03	.01	CLAYEY SILT to SILTY CLAY	9
6.000	19.69	16.3	2.29	.01	CLAYEY SILT to SILTY CLAY	8
6.150	20.18	15.2	2.56	.02	CLAYEY SILT to SILTY CLAY	8

TOP 1.0 ft IS DISTURBED SOIL
*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-8

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
6.300	20.67	9.8	1.92	.02	CLAYEY SILT to SILTY CLAY	5
6.450	21.16	9.1	1.64	.02	CLAYEY SILT to SILTY CLAY	5
6.600	21.65	14.4	3.39	.02	CLAY to SILTY CLAY	10
6.750	22.15	17.4	2.38	.03	CLAYEY SILT to SILTY CLAY	9
6.900	22.64	25.4	3.01	.04	CLAYEY SILT to SILTY CLAY	13
7.050	23.13	35.4	4.14	.05	CLAY to SILTY CLAY	24
7.200	23.62	48.8	3.62	.05	CLAYEY SILT to SILTY CLAY	24
7.350	24.11	72.0	2.81	.07	SANDY SILT to CLAYEY SILT	29
7.500	24.61	74.4	2.05	.07	SILTY SAND to SANDY SILT	25
7.650	25.10	50.8	2.49	.09	SANDY SILT to CLAYEY SILT	20
7.800	25.59	49.0	2.42	.09	SANDY SILT to CLAYEY SILT	20
7.950	26.08	11.9	1.38	.09	CLAYEY SILT to SILTY CLAY	6
8.100	26.57	12.5	1.41	.09	CLAYEY SILT to SILTY CLAY	6
8.250	27.07	10.2	1.44	.09	CLAYEY SILT to SILTY CLAY	5
8.400	27.56	12.1	1.85	.09	CLAYEY SILT to SILTY CLAY	6
8.550	28.05	10.5	2.58	.09	CLAY to SILTY CLAY	7
8.700	28.54	10.2	2.24	.11	CLAYEY SILT to SILTY CLAY	5
8.850	29.04	22.5	3.73	.12	CLAY to SILTY CLAY	15
9.000	29.53	20.6	2.87	.12	CLAYEY SILT to SILTY CLAY	10
9.150	30.02	15.0	1.59	.13	CLAYEY SILT to SILTY CLAY	7
9.300	30.51	31.1	3.23	.13	CLAYEY SILT to SILTY CLAY	16
9.450	31.00	38.6	3.97	.14	CLAYEY SILT to SILTY CLAY	19
9.600	31.50	26.6	5.90	.15	CLAY	27
9.750	31.99	91.9	2.03	.18	SILTY SAND to SANDY SILT	31
9.900	32.48	125.8	2.10	.19	SILTY SAND to SANDY SILT	42
10.050	32.97	144.6	2.10	.20	SILTY SAND to SANDY SILT	48
10.200	33.46	164.7	2.13	.21	SILTY SAND to SANDY SILT	55
10.350	33.96	185.1	2.18	.22	SILTY SAND to SANDY SILT	62
10.500	34.45	203.0	1.86	.23	SAND to SILTY SAND	51
10.650	34.94	225.8	1.94	.25	SAND to SILTY SAND	56
10.800	35.43	194.4	2.09	.25	SILTY SAND to SANDY SILT	65
10.950	35.93	206.1	2.40	.25	SILTY SAND to SANDY SILT	69
11.100	36.42	212.0	2.47	.26	SILTY SAND to SANDY SILT	71
11.250	36.91	209.2	2.12	.27	SILTY SAND to SANDY SILT	70
11.400	37.40	173.2	1.70	.26	SAND to SILTY SAND	43
11.550	37.89	71.0	2.69	.26	SANDY SILT to CLAYEY SILT	28
11.700	38.39	41.4	1.22	.23	SILTY SAND to SANDY SILT	14
11.850	38.88	53.5	2.38	.23	SANDY SILT to CLAYEY SILT	21
12.000	39.37	88.3	2.63	.23	SANDY SILT to CLAYEY SILT	35
12.150	39.86	123.8	1.80	.24	SILTY SAND to SANDY SILT	41
12.300	40.35	160.2	1.81	.25	SAND to SILTY SAND	40
12.450	40.85	150.6	1.63	.25	SAND to SILTY SAND	38
12.600	41.34	121.2	1.73	.25	SILTY SAND to SANDY SILT	40
12.750	41.83	87.7	2.40	.24	SILTY SAND to SANDY SILT	29
12.900	42.32	29.1	2.59	.24	CLAYEY SILT to SILTY CLAY	15
13.050	42.81	37.5	3.04	.24	CLAYEY SILT to SILTY CLAY	19
13.200	43.31	55.0	1.54	.24	SILTY SAND to SANDY SILT	18
13.350	43.80	68.1	1.73	.24	SILTY SAND to SANDY SILT	23
13.500	44.29	90.0	.36	.25	SAND to SILTY SAND	22
13.650	44.78	51.8	2.97	.25	SANDY SILT to CLAYEY SILT	21

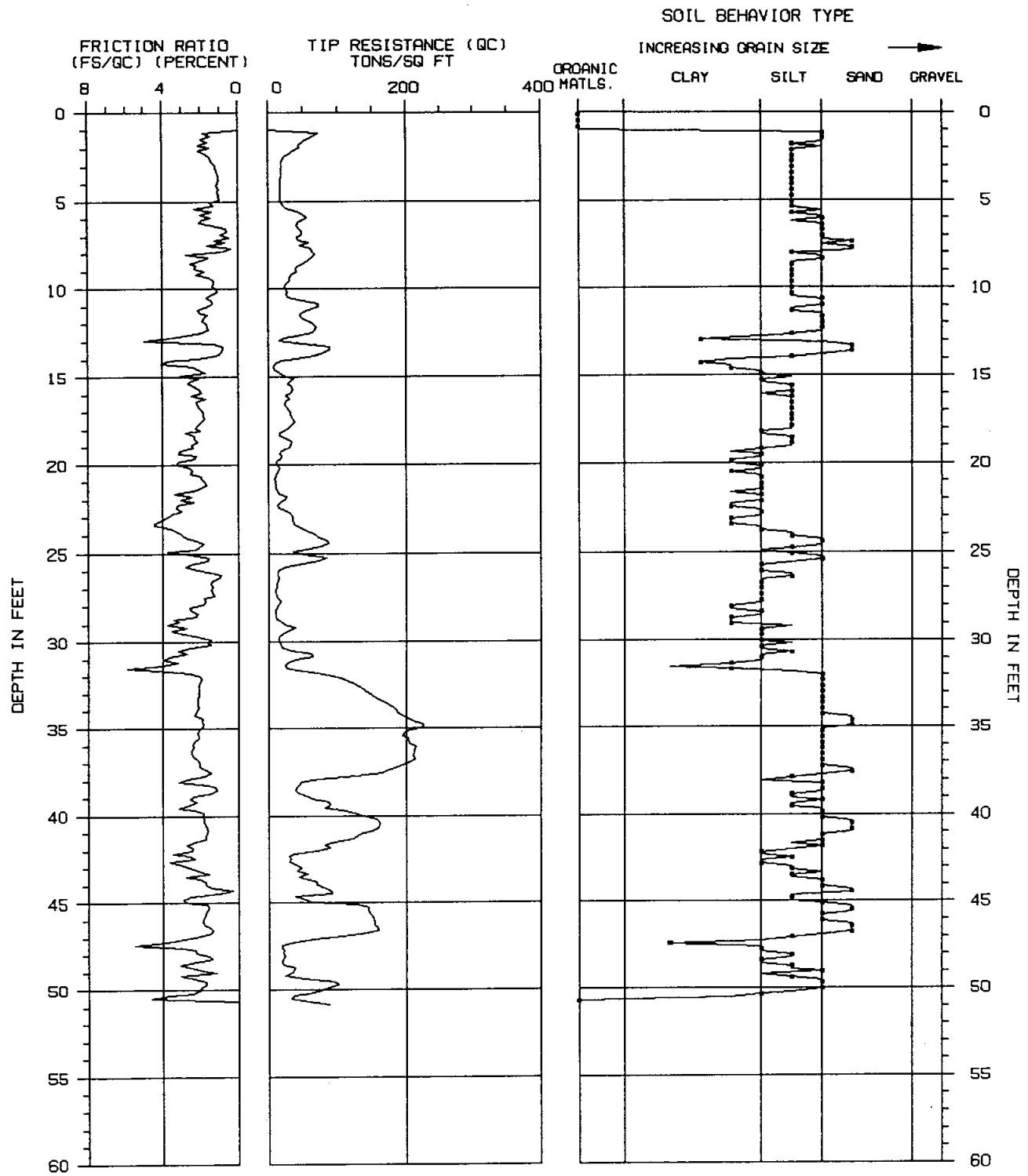
*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

SOUNDING : CPT-8

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
13.800	45.28	143.8	1.58	.26	SAND to SILTY SAND	36
13.950	45.77	149.6	1.80	.26	SILTY SAND to SANDY SILT	50
14.100	46.26	153.6	1.77	.27	SAND to SILTY SAND	38
14.250	46.75	142.6	1.44	.28	SAND to SILTY SAND	36
14.400	47.24	37.1	3.81	.27	CLAYEY SILT to SILTY CLAY	19
14.550	47.74	22.0	2.26	.27	CLAYEY SILT to SILTY CLAY	11
14.700	48.23	20.0	1.43	.29	SANDY SILT to CLAYEY SILT	8
14.850	48.72	37.1	2.45	.29	SANDY SILT to CLAYEY SILT	15
15.000	49.21	23.6	3.03	.29	CLAYEY SILT to SILTY CLAY	12
15.150	49.70	100.3	1.70	.31	SILTY SAND to SANDY SILT	33
15.300	50.20	58.8	2.39	.31	SANDY SILT to CLAYEY SILT	24
15.450	50.69	56.4	*****	.32		0

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

Interpretations based on: Robertson and Campanella, 1989.



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

ASSUMED TOTAL UNIT WT = 115 PCF

ASSUMED DEPTH OF WATER TABLE = 43.0 FT

SOIL BEHAVIOR TYPE INTERPRETATIONS BASED ON: GUIDELINES FOR GEOTECHNICAL DESIGN USING THE CPT AND CPTU. SOIL MECHANICS SERIES #120. UNIVERSITY OF BRITISH COLUMBIA, SEPTEMBER 1989. BY P.K. ROBERTSON AND R.G. CAMPANELLA.

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-8

PROJECT NAME : EKI/WEBB

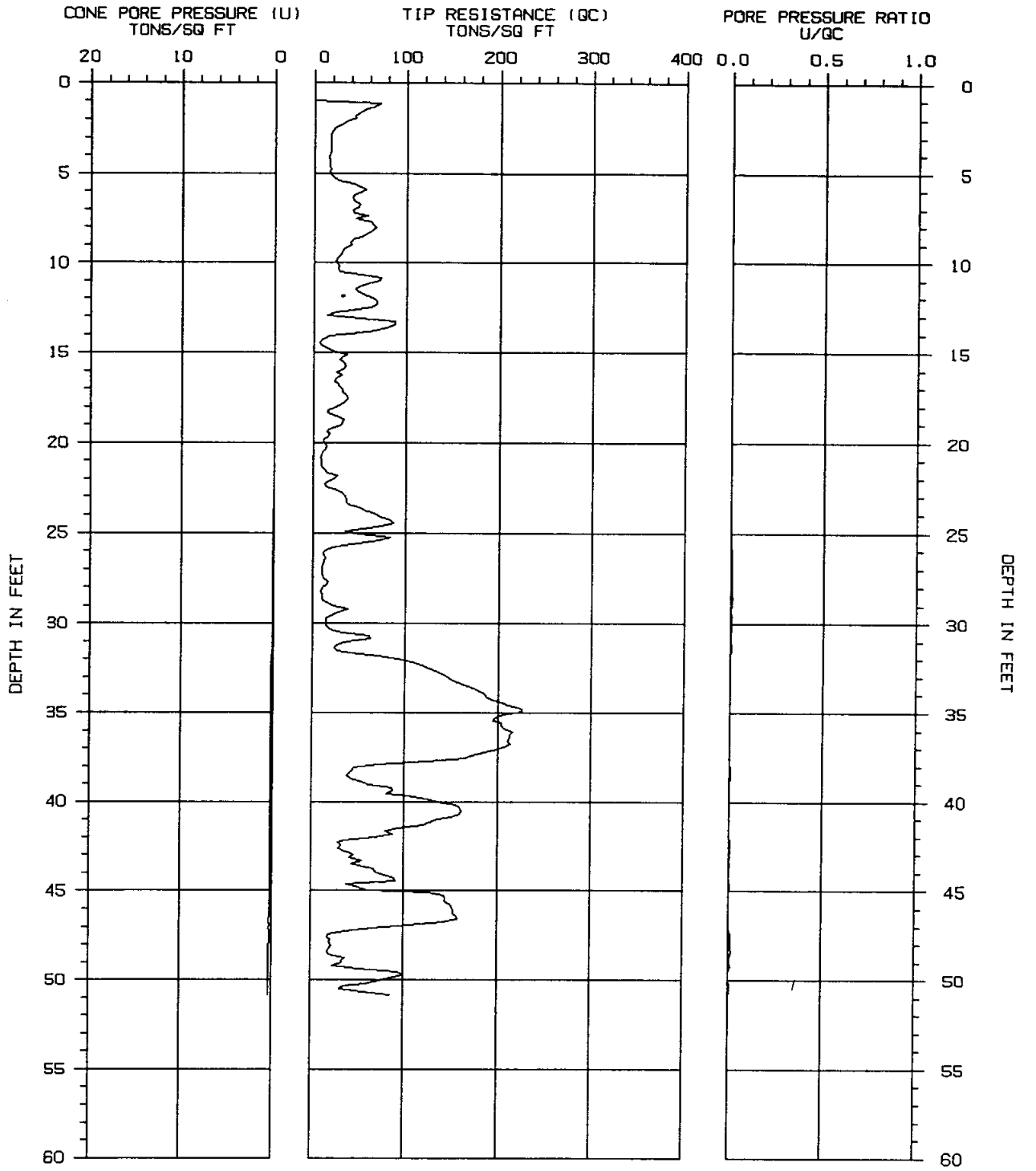
PROJECT NUMBER : 98-E623

CONE/RIG : 473/R±3 KC/MR

DATE/TIME: 10-02-98 11:27

HFA

000974



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST · SOUNDING NUMBER: CPT-8

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-02-98 11:27

HFA

CONE PENETRATION TEST

SOUNDING : CPT-9
PROJECT : EKI/WEBB
DATE/TIME: 10-02-98 13:30

PROJECT No.: 98-E623
CONE/RIG : 473/R#3 KC/MR

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	o CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
.150	.49	.0	.00	.00		0
.300	.98	.0	.00	.00		0
.450	1.48	58.1	2.46	-.01	SANDY SILT to CLAYEY SILT	23
.600	1.97	88.0	1.46	.02	SILTY SAND to SANDY SILT	29
.750	2.46	46.5	1.68	.00	SILTY SAND to SANDY SILT	15
.900	2.95	38.9	1.19	.00	SILTY SAND to SANDY SILT	13
1.050	3.44	23.0	1.36	.00	SANDY SILT to CLAYEY SILT	9
1.200	3.94	20.3	1.48	-.01	SANDY SILT to CLAYEY SILT	8
1.350	4.43	22.2	1.40	-.01	SANDY SILT to CLAYEY SILT	9
1.500	4.92	22.7	1.40	-.01	SANDY SILT to CLAYEY SILT	9
1.650	5.41	26.5	1.31	-.02	SANDY SILT to CLAYEY SILT	11
1.800	5.91	25.1	1.48	-.04	SANDY SILT to CLAYEY SILT	10
1.950	6.40	25.8	1.64	-.04	SANDY SILT to CLAYEY SILT	10
2.100	6.89	26.5	1.39	-.04	SANDY SILT to CLAYEY SILT	11
2.250	7.38	21.4	1.84	-.05	SANDY SILT to CLAYEY SILT	9
2.400	7.87	18.0	1.98	-.04	CLAYEY SILT to SILTY CLAY	9
2.550	8.37	15.9	1.36	-.05	SANDY SILT to CLAYEY SILT	6
2.700	8.86	15.9	1.62	-.06	CLAYEY SILT to SILTY CLAY	8
2.850	9.35	18.1	1.61	-.06	SANDY SILT to CLAYEY SILT	7
3.000	9.84	23.4	1.42	-.06	SANDY SILT to CLAYEY SILT	9
3.150	10.33	21.1	1.41	-.06	SANDY SILT to CLAYEY SILT	8
3.300	10.83	21.9	1.49	-.06	SANDY SILT to CLAYEY SILT	9
3.450	11.32	23.4	2.18	-.06	SANDY SILT to CLAYEY SILT	9
3.600	11.81	33.9	1.69	-.06	SANDY SILT to CLAYEY SILT	14
3.750	12.30	32.3	2.36	-.05	SANDY SILT to CLAYEY SILT	13
3.900	12.80	15.1	3.37	-.05	CLAY to SILTY CLAY	10
4.050	13.29	45.8	1.88	-.04	SANDY SILT to CLAYEY SILT	18
4.200	13.78	36.3	3.43	-.03	CLAYEY SILT to SILTY CLAY	18
4.350	14.27	13.6	3.78	-.03	CLAY	14
4.500	14.76	16.9	1.76	-.03	CLAYEY SILT to SILTY CLAY	8
4.650	15.26	8.8	2.26	-.02	CLAY to SILTY CLAY	6
4.800	15.75	18.6	1.96	-.03	CLAYEY SILT to SILTY CLAY	9
4.950	16.24	11.5	3.54	-.03	CLAY	11
5.100	16.73	30.3	2.79	-.02	CLAYEY SILT to SILTY CLAY	15
5.250	17.22	30.9	2.56	-.01	SANDY SILT to CLAYEY SILT	12
5.400	17.72	32.8	2.15	-.01	SANDY SILT to CLAYEY SILT	13
5.550	18.21	67.9	1.62	.00	SILTY SAND to SANDY SILT	23
5.700	18.70	24.2	2.86	.00	CLAYEY SILT to SILTY CLAY	12
5.850	19.19	11.5	1.44	.00	CLAYEY SILT to SILTY CLAY	6
6.000	19.69	10.1	2.64	.00	CLAY to SILTY CLAY	7
6.150	20.18	17.7	1.41	.00	SANDY SILT to CLAYEY SILT	7

TOP 1.0 ft IS DISTURBED SOIL
*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

HOLGUIN, FAHAN & ASSOCIATES, INC.

Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-9

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
6.300	20.67	13.4	1.52	.00	CLAYEY SILT to SILTY CLAY	7
6.450	21.16	13.8	1.91	.01	CLAYEY SILT to SILTY CLAY	7
6.600	21.65	7.3	2.17	.01	CLAY to SILTY CLAY	5
6.750	22.15	7.6	2.34	.01	CLAY to SILTY CLAY	5
6.900	22.64	7.9	3.35	.02	CLAY	8
7.050	23.13	42.8	3.86	.02	CLAYEY SILT to SILTY CLAY	21
7.200	23.62	55.3	3.94	.03	CLAYEY SILT to SILTY CLAY	28
7.350	24.11	84.4	2.48	.05	SANDY SILT to CLAYEY SILT	34
7.500	24.61	53.6	3.01	.05	SANDY SILT to CLAYEY SILT	21
7.650	25.10	18.6	5.17	.05	CLAY	19
7.800	25.59	59.5	2.08	.06	SILTY SAND to SANDY SILT	20
7.950	26.08	76.8	1.88	.06	SILTY SAND to SANDY SILT	26
8.100	26.57	51.9	2.67	.06	SANDY SILT to CLAYEY SILT	21
8.250	27.07	13.7	2.86	.06	CLAY to SILTY CLAY	9
8.400	27.56	10.3	2.97	.06	CLAY to SILTY CLAY	7
8.550	28.05	8.2	2.47	.06	CLAY to SILTY CLAY	5
8.700	28.54	11.1	2.15	.08	CLAYEY SILT to SILTY CLAY	6
8.850	29.04	8.0	3.15	.08	CLAY	8
9.000	29.53	8.9	2.90	.08	CLAY to SILTY CLAY	6
9.150	30.02	18.2	2.12	.09	CLAYEY SILT to SILTY CLAY	9
9.300	30.51	13.1	1.64	.09	CLAYEY SILT to SILTY CLAY	7
9.450	31.00	12.9	2.53	.10	CLAYEY SILT to SILTY CLAY	6
9.600	31.50	92.3	2.10	.12	SILTY SAND to SANDY SILT	31
9.750	31.99	61.7	2.37	.13	SANDY SILT to CLAYEY SILT	25
9.900	32.48	24.7	2.81	.13	CLAYEY SILT to SILTY CLAY	12
10.050	32.97	90.1	1.81	.14	SILTY SAND to SANDY SILT	30
10.200	33.46	133.3	1.59	.15	SAND to SILTY SAND	33
10.350	33.96	131.6	1.99	.15	SILTY SAND to SANDY SILT	44
10.500	34.45	156.6	2.17	.16	SILTY SAND to SANDY SILT	52
10.650	34.94	174.5	1.99	.18	SILTY SAND to SANDY SILT	58
10.800	35.43	218.5	1.90	.18	SAND to SILTY SAND	55
10.950	35.93	202.8	1.58	.18	SAND to SILTY SAND	51
11.100	36.42	192.0	1.87	.18	SAND to SILTY SAND	48
11.250	36.91	207.0	1.93	.18	SAND to SILTY SAND	52
11.400	37.40	214.1	2.03	.19	SILTY SAND to SANDY SILT	71
11.550	37.89	185.9	2.04	.19	SILTY SAND to SANDY SILT	62
11.700	38.39	117.6	1.69	.19	SILTY SAND to SANDY SILT	39
11.850	38.88	27.0	2.10	.15	SANDY SILT to CLAYEY SILT	11
12.000	39.37	33.0	2.68	.15	CLAYEY SILT to SILTY CLAY	17
12.150	39.86	68.5	2.25	.16	SILTY SAND to SANDY SILT	23
12.300	40.35	163.7	1.80	.18	SAND to SILTY SAND	41
12.450	40.85	199.5	1.88	.18	SAND to SILTY SAND	50
12.600	41.34	206.8	1.80	.19	SAND to SILTY SAND	52
12.750	41.83	163.3	1.51	.19	SAND to SILTY SAND	41
12.900	42.32	68.6	3.08	.18	SANDY SILT to CLAYEY SILT	27
13.050	42.81	30.5	3.02	.18	CLAYEY SILT to SILTY CLAY	15
13.200	43.31	34.5	3.38	.18	CLAYEY SILT to SILTY CLAY	17
13.350	43.80	58.5	3.51	.18	CLAYEY SILT to SILTY CLAY	29
13.500	44.29	101.2	2.29	.19	SILTY SAND to SANDY SILT	34
13.650	44.78	159.9	.94	.20	SAND	32

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

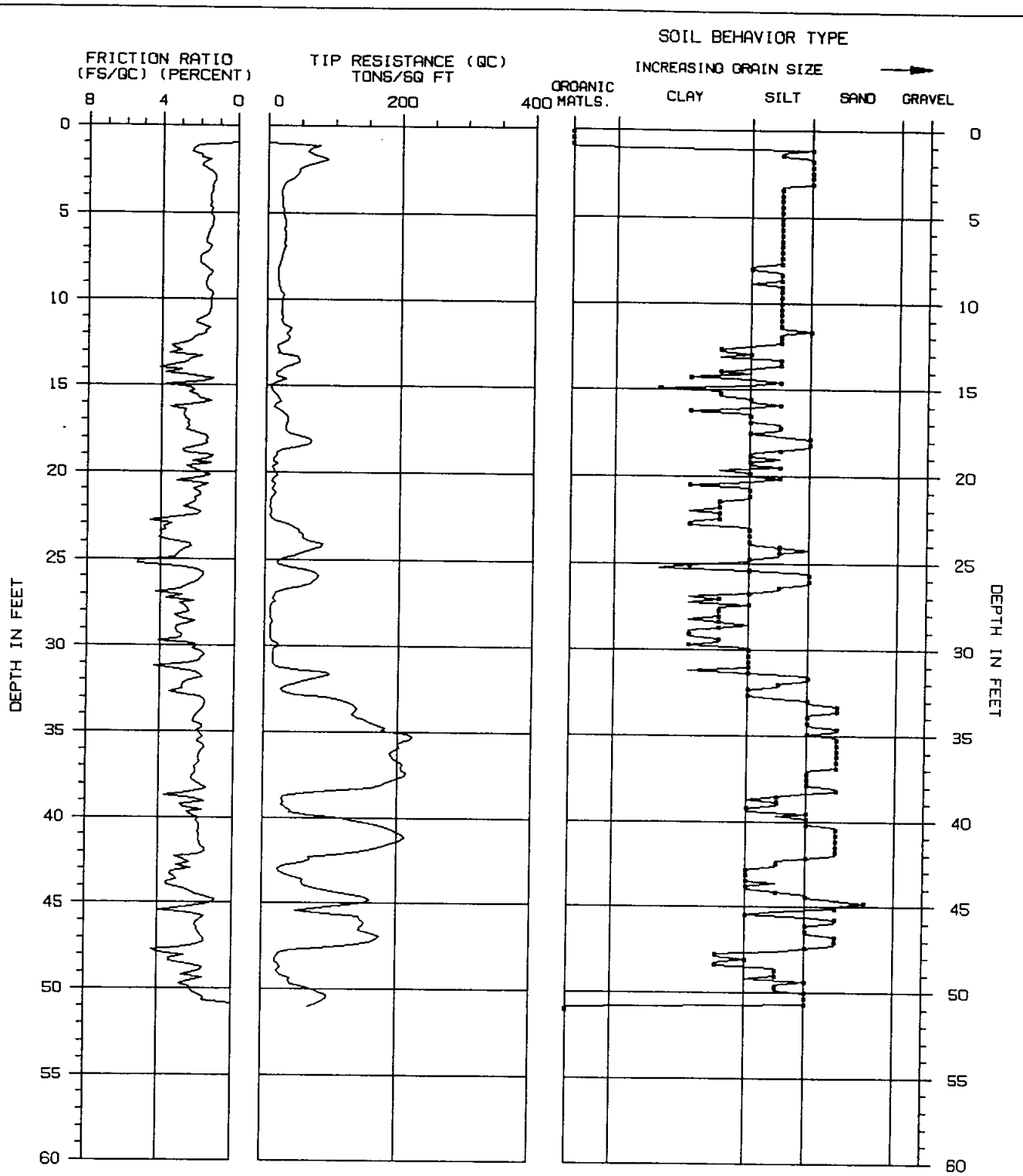
Interpretations based on: Robertson and Campanella, 1989.

SOUNDING : CPT-9

DEPTH (m)	DEPTH (ft)	TIP RESISTANCE (tsf)	FRICTION RATIO (%)	CONE PORE PRESSURE (tsf)	SOIL BEHAVIOR TYPE	N(60)
13.800	45.28	83.8	2.61	.20	SANDY SILT to CLAYEY SILT	34
13.950	45.77	144.4	1.53	.21	SAND to SILTY SAND	36
14.100	46.26	150.1	1.98	.21	SILTY SAND to SANDY SILT	50
14.250	46.75	161.1	1.79	.22	SAND to SILTY SAND	40
14.400	47.24	159.7	1.53	.22	SAND to SILTY SAND	40
14.550	47.74	43.6	4.34	.22	CLAY to SILTY CLAY	29
14.700	48.23	20.3	3.40	.22	CLAY to SILTY CLAY	14
14.850	48.72	26.8	1.55	.24	SANDY SILT to CLAYEY SILT	11
15.000	49.21	29.6	2.69	.24	CLAYEY SILT to SILTY CLAY	15
15.150	49.70	43.3	2.79	.25	SANDY SILT to CLAYEY SILT	17
15.300	50.20	88.0	2.04	.26	SILTY SAND to SANDY SILT	29
15.450	50.69	90.4	1.57	.27	SILTY SAND to SANDY SILT	30

*INDICATES OVERCONSOLIDATED OR CEMENTED MATERIAL
ASSUMED TOTAL UNIT WT = 115 pcf
ASSUMED DEPTH OF WATER TABLE = 43.0 ft
N(60) = EQUIVALENT SPT VALUE (60% Energy)

Interpretations based on: Robertson and Campanella, 1989.



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

ASSUMED TOTAL UNIT WT = 115 PCF

ASSUMED DEPTH OF WATER TABLE = 43.0 FT

SOIL BEHAVIOR TYPE INTERPRETATIONS BASED ON: GUIDELINES FOR GEOTECHNICAL DESIGN USING THE CPT AND CPTU. SOIL MECHANICS SERIES #120, UNIVERSITY OF BRITISH COLUMBIA, SEPTEMBER 1989, BY P.K. ROBERTSON AND R.G. CAMPANELLA.

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-9

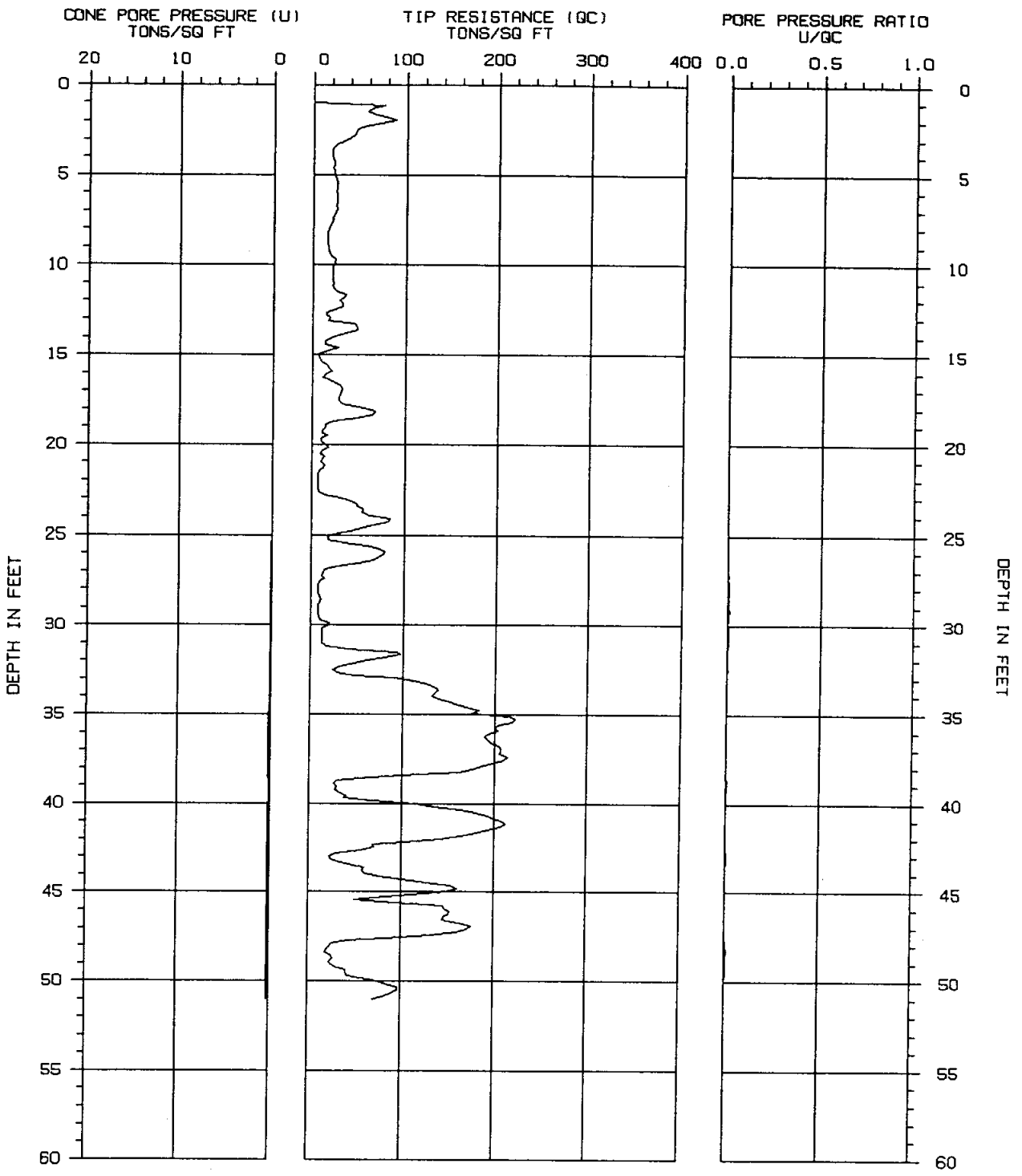
PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

DATE/TIME: 10-02-98 13:30

HFA



TOP 1.0 FT IS DISTURBED SOIL

TIP RESISTANCE NOT CORRECTED FOR END AREA EFFECT

CONE PENETRATION TEST

SOUNDING NUMBER: CPT-9

PROJECT NAME : EKI/WEBB

PROJECT NUMBER : 98-E623

CONE/RIG : 473/R#3 KC/MR

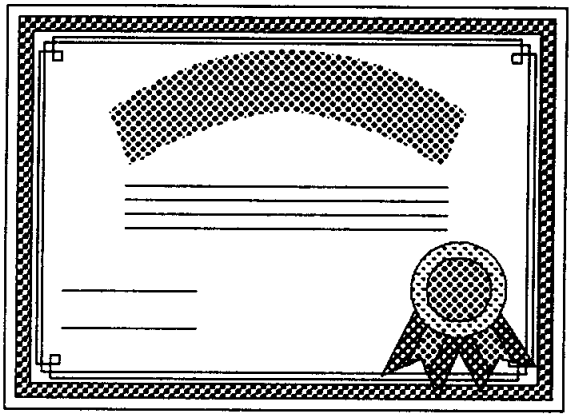
DATE/TIME: 10-02-98 13:30

HFA

APPENDIX B

Laboratory Reports and Chain-of-Custody Forms
for PIPP Groundwater Sampling

ORANGE COAST ANALYTICAL, INC.
3002 Dow, Suite 532, Tustin, CA 92780 (714) 832-0064 Fax (714) 832-0067
4620 E. Elwood, Suite 4, Phoenix, AZ 85040 (602) 736-0960 Fax (602) 736-0970



ORANGE COAST ANALYTICAL THANKS YOU FOR YOUR BUSINESS

THE FOLLOWING PAGES ARE THE ANALYSIS REPORT

ON THE SAMPLES YOU REQUESTED.

IF YOU HAVE ANY QUESTIONS REGARDING THIS REPORT

PLEASE FEEL FREE TO CONTACT US.

ORANGE COAST ANALYTICAL, INC.
3002 Dow, Suite 532, Tustin, CA 92780 (714) 832-0064 Fax (714) 832-0067
4620 E. Elwood, Suite 4, Phoenix, AZ 85040 (602) 736-0960 Fax (602) 736-0970

LABORATORY REPORT FORM

Laboratory Name: ORANGE COAST ANALYTICAL, INC.

Address: 3002 Dow Suite 532 Tustin, CA 92780

Telephone: (714) 832-0064

Laboratory Certification
(ELAP) No.: 1416 Expiration Date: 1999

Laboratory Director's Name (Print) : Mark Noorani

Client: Erler & Kalinowski, Inc.

Project No.: 961025.02

Project Name: Webb

Laboratory Reference: EKI 10484

Analytical Method: EPA 8260

Date Sampled: 10/01-02/1998
Date Received: 10/02/98
Date Reported: 10/08/98

Sample Matrix: Water

Chain of Custody Received: Yes

Laboratory Director's Signature: Mark Noorani

ORANGE COAST ANALYTICAL, INC.
3002 Dow, Suite 532, Tustin, CA 92780 (714) 832-0064 Fax (714) 832-0067
4620 E. Elwood, Suite 4, Phoenix, AZ 85040 (602) 736-0960 Fax (602) 736-0970

ANALYTICAL TEST RESULTS 8260

Reporting Unit: ug/l

DATE ANALYZED		10/06/98	10/06/98	10/06/98	10/06/98
DILUTION FACTOR			1	1	1
LAB SAMPLE I.D.			98100028	98100029	98100030
CLIENT SAMPLE I.D.			CPT-1-55	CPT-1-95	CPT-3
COMPOUND	MDL	MB			
Acetone	2.0	<2.0	170	8.1	170
Benzene	0.5	<0.5	1.6	<0.5	0.58
Bromodichloromethane	0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	1.0	<1.0	<1.0	<1.0	<1.0
2-Butanone	1.0	<1.0	4.6	<1.0	2.7
Carbon Disulfide	0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	0.5	<0.5	<0.5	<0.5	<0.5
Chlorodibromomethane	0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	0.5	<0.5	<0.5	<0.5	<0.5
2-Chloroethyl vinyl ether	1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	0.5	<0.5	<0.5	5.3	<0.5
1,1-Dichloroethene	0.5	<0.5	<0.5	<0.5	<0.5
cis 1,2-Dichloroethene	0.5	<0.5	<0.5	<0.5	2.6
Trans 1,2-Dichloroethene	0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	0.5	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropene	0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	0.5	<0.5	<0.5	<0.5	<0.5
2-Hexanone	1.0	<1.0	<1.0	<1.0	<1.0
Methylene chloride	2.5	<2.5	<2.5	<2.5	<2.5
4-Methyl-2-pentanone	1.0	<1.0	<1.0	<1.0	<1.0
Styrene	0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene	0.5	<0.5	<0.5	<0.5	<0.5
Toluene	0.5	<0.5	<0.5	<0.5	0.55
1,1,1-Trichloroethane	0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	0.5	<0.5	<0.5	<0.5	6.3
Trichlorofluoromethane	0.5	<0.5	<0.5	<0.5	<0.5
Vinyl acetate	1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	0.5	<0.5	<0.5	<0.5	<0.5
Total Xylenes	0.5	<0.5	1.6	<0.5	0.66

SURROGATE	SPK	ACP%	MB			
RECOVERY	CONC		%RC			
Dibromofluoromethane	20	86-118	86	88	89	92
Toluene-d8	20	88-110	97	96	95	97
4-Bromofluorobenzene	20	86-115	94	94	95	96

ORANGE COAST ANALYTICAL, INC.
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4620 E. Elwood, Suite 4, Phoenix, AZ 85040 (602) 736-0960 Fax (602) 736-0970

ANALYTICAL TEST RESULTS 8260
Reporting Unit: ug/l

DATE ANALYZED		10/06/98	10/06/98	10/07/98	10/06/98
DILUTION FACTOR		1	25	2	2
LAB SAMPLE I.D.			98100031	98100032	98100033
CLIENT SAMPLE I.D.			CPT-5	CPT-2	CPT-4A
COMPOUND	*MDL*	*MB*			
Acetone	2.0	<2.0	480	300	95
Benzene	0.5	<0.5	<13	<1.0	<1.0
Bromodichloromethane	0.5	<0.5	<13	<1.0	<1.0
Bromoform	0.5	<0.5	<13	<1.0	<1.0
Bromomethane	1.0	<1.0	<25	<2.0	<2.0
2-Butanone	1.0	<1.0	<25	3.5	2.2
Carbon Disulfide	0.5	<0.5	<13	<1.0	<1.0
Carbon Tetrachloride	0.5	<0.5	<13	<1.0	<1.0
Chlorobenzene	0.5	<0.5	<13	<1.0	<1.0
Chlorodibromomethane	0.5	<0.5	<13	<1.0	<1.0
Chloroethane	0.5	<0.5	<13	<1.0	<1.0
2-Chloroethyl vinyl ether	1.0	<1.0	<25	<2.0	<2.0
Chloroform	0.5	<0.5	<13	<1.0	<1.0
Chloromethane	0.5	<0.5	<13	<1.0	<1.0
1,1-Dichloroethane	0.5	<0.5	<13	<1.0	1.2
1,2-Dichloroethane	0.5	<0.5	<13	<1.0	<1.0
1,1-Dichloroethene	0.5	<0.5	<13	<1.0	4.1
cis 1,2-Dichloroethene	0.5	<0.5	110	<1.0	11
Trans 1,2-Dichloroethene	0.5	<0.5	<13	<1.0	<1.0
1,2-Dichloropropane	0.5	<0.5	<13	<1.0	<1.0
cis-1,3-Dichloropropene	0.5	<0.5	<13	<1.0	<1.0
trans-1,3-Dichloropropene	0.5	<0.5	<13	<1.0	<1.0
Ethylbenzene	0.5	<0.5	<13	<1.0	<1.0
2-Hexanone	1.0	<1.0	<25	<2.0	<2.0
Methylene chloride	2.5	<2.5	<63	<5.0	<5.0
4-Methyl-2-pentanone	1.0	<1.0	<25	<2.0	<2.0
Styrene	0.5	<0.5	<13	<1.0	<1.0
1,1,2,2-Tetrachloroethane	0.5	<0.5	<13	<1.0	<1.0
Tetrachloroethene	0.5	<0.5	<13	<1.0	<1.0
Toluene	0.5	<0.5	<13	1.1	1.1
1,1,1-Trichloroethane	0.5	<0.5	<13	<1.0	<1.0
1,1,2-Trichloroethane	0.5	<0.5	<13	<1.0	<1.0
Trichloroethene	0.5	<0.5	3,800	1.6	220
Trichlorofluoromethane	0.5	<0.5	<13	<1.0	<1.0
Vinyl acetate	1.0	<1.0	<25	<2.0	<2.0
Vinyl Chloride	0.5	<0.5	<13	<1.0	<1.0
Total Xylenes	0.5	<0.5	<13	<1.0	1.2

SURROGATE	SPK	ACP%	MB			
RECOVERY	CONC		%RC			
Dibromofluoromethane	20	86-118	86	95	96	92
Toluene-d8	20	88-110	97	96	97	96
4-Bromofluorobenzene	20	86-115	94	97	98	94

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ANALYTICAL TEST RESULTS 8260

Reporting Unit: ug/l

DATE ANALYZED		10/06/98	10/06/98	10/06/98	10/07/98
DILUTION FACTOR			2	250	200
LAB SAMPLE I.D.			98100034	98100035	98100036
CLIENT SAMPLE I.D.			CPT-4B	CPT-7	CPT-6
COMPOUND	*MDL*	*MB*			
Acetone	2.0	<2.0	80	<500	<400
Benzene	0.5	<0.5	<1.0	<125	<100
Bromodichloromethane	0.5	<0.5	<1.0	<125	<100
Bromoform	0.5	<0.5	<1.0	<125	<100
Bromomethane	1.0	<1.0	<2.0	<250	<200
2-Butanone	1.0	<1.0	8.4	<250	<200
Carbon Disulfide	0.5	<0.5	<1.0	<125	<100
Carbon Tetrachloride	0.5	<0.5	<1.0	<125	<100
Chlorobenzene	0.5	<0.5	<1.0	<125	<100
Chlorodibromomethane	0.5	<0.5	<1.0	<125	<100
Chloroethane	0.5	<0.5	<1.0	<125	<100
2-Chloroethyl vinyl ether	1.0	<1.0	<2.0	<250	<200
Chloroform	0.5	<0.5	<1.0	<125	<100
Chloromethane	0.5	<0.5	<1.0	<125	<100
1,1-Dichloroethane	0.5	<0.5	1.1	160	240
1,2-Dichloroethane	0.5	<0.5	<1.0	<125	<100
1,1-Dichloroethene	0.5	<0.5	3.4	<125	<100
cis 1,2-Dichloroethene	0.5	<0.5	10	190	130
Trans 1,2-Dichloroethene	0.5	<0.5	<1.0	<125	<100
1,2-Dichloropropane	0.5	<0.5	<1.0	<125	<100
cis-1,3-Dichloropropene	0.5	<0.5	<1.0	<125	<100
trans-1,3-Dichloropropene	0.5	<0.5	<1.0	<125	<100
Ethylbenzene	0.5	<0.5	<1.0	<125	<100
2-Hexanone	1.0	<1.0	<2.0	<250	<200
Methylene chloride	2.5	<2.5	<5.0	<625	<500
4-Methyl-2-pentanone	1.0	<1.0	<1.0	<250	<200
Styrene	0.5	<0.5	<1.0	<125	<100
1,1,2,2-Tetrachloroethane	0.5	<0.5	<1.0	<125	<100
Tetrachloroethene	0.5	<0.5	<1.0	<125	110
Toluene	0.5	<0.5	<1.0	<125	<100
1,1,1-Trichloroethane	0.5	<0.5	<1.0	<125	<100
1,1,2-Trichloroethane	0.5	<0.5	<1.0	<125	<100
Trichloroethene	0.5	<0.5	200	27,000	35,000
Trichlorofluoromethane	0.5	<0.5	<1.0	<125	<100
Vinyl acetate	1.0	<1.0	<2.0	<250	<200
Vinyl Chloride	0.5	<0.5	<1.0	<125	<100
Total Xylenes	0.5	<0.5	<1.0	<125	<100

SURROGATE	SPK	ACP%	MB			
RECOVERY	CONC		%RC			
Dibromofluoromethane	20	86-118	86	95	94	98
Toluene-d8	20	88-110	97	98	96	96
4-Bromofluorobenzene	20	86-115	94	96	96	97

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ANALYTICAL TEST RESULTS 8260

Reporting Unit: ug/l

DATE ANALYZED		10/07/98	10/06/98	10/07/98
DILUTION FACTOR			1	2
LAB SAMPLE I.D.			98100037	98100038
CLIENT SAMPLE I.D.			CPT-8	CPT-9
COMPOUND	MDL	MB		
Acetone	2.0	<2.0	16	490
Benzene	0.5	<0.5	<0.5	<1.0
Bromodichloromethane	0.5	<0.5	<0.5	<1.0
Bromoform	0.5	<0.5	<0.5	<1.0
Bromomethane	1.0	<1.0	<1.0	<2.0
2-Butanone	1.0	<1.0	<1.0	7.7
Carbon Disulfide	0.5	<0.5	<0.5	<1.0
Carbon Tetrachloride	0.5	<0.5	<0.5	<1.0
Chlorobenzene	0.5	<0.5	<0.5	<1.0
Chlorodibromomethane	0.5	<0.5	<0.5	<1.0
Chloroethane	0.5	<0.5	<0.5	<1.0
2-Chloroethyl vinyl ether	1.0	<1.0	<1.0	<2.0
Chloroform	0.5	<0.5	<0.5	<1.0
Chloromethane	0.5	<0.5	<0.5	<1.0
1,1-Dichloroethane	0.5	<0.5	1.4	<1.0
1,2-Dichloroethane	0.5	<0.5	<0.5	<1.0
1,1-Dichloroethene	0.5	<0.5	6.7	<1.0
cis 1,2-Dichloroethene	0.5	<0.5	11	<1.0
Trans 1,2-Dichloroethene	0.5	<0.5	1.3	<1.0
1,2-Dichloropropane	0.5	<0.5	<0.5	<1.0
cis-1,3-Dichloropropene	0.5	<0.5	<0.5	<1.0
trans-1,3-Dichloropropene	0.5	<0.5	<0.5	<1.0
Ethylbenzene	0.5	<0.5	<0.5	<1.0
2-Hexanone	1.0	<1.0	<1.0	<2.0
Methylene chloride	2.5	<2.5	<2.5	<5.0
4-Methyl-2-pentanone	1.0	<1.0	<1.0	<2.0
Styrene	0.5	<0.5	<0.5	<1.0
1,1,2,2-Tetrachloroethane	0.5	<0.5	<0.5	<1.0
Tetrachloroethene	0.5	<0.5	<0.5	<1.0
Toluene	0.5	<0.5	<0.5	<1.0
1,1,1-Trichloroethane	0.5	<0.5	<0.5	<1.0
1,1,2-Trichloroethane	0.5	<0.5	<0.5	<1.0
Trichloroethene	0.5	<0.5	140	9.1
Trichlorofluoromethane	0.5	<0.5	<0.5	<1.0
Vinyl acetate	1.0	<1.0	<1.0	<2.0
Vinyl Chloride	0.5	<0.5	<0.5	<1.0
Total Xylenes	0.5	<0.5	<0.5	<1.0

SURROGATE	SPK	ACP%	MB		
RECOVERY	CONC		%RC		
Dibromofluoromethane	20	86-118	91	96	96
Toluene-d8	20	88-110	98	98	97
4-Bromofluorobenzene	20	86-115	96	98	96

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8260 QA / QC REPORT
Reporting Unit : µg/l

1 . Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Date Performed :10/06/98

LAB Sample I . D . : 98100029

Analyte	R1	SP CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD
1,1-Dichloroethene	0.0	20	17	18	85	90	6	61-145	14
Benzene	0.0	20	16	18	80	90	12	76-127	11
Trihloroethene	0.0	20	17	19	85	95	11	71-120	14
Toluene	0.0	20	16	18	80	90	12	76-125	13
Chlorobenzene	0.0	20	17	19	85	95	11	75-130	13

R1 = Result of Laboratory Sample I.D.
SPK CONC = Spiking Concentration (≤5 X PQL) ; PQL = Practical Quantitation Limit.
MS = Matrix Spike Result
MSD = Matrix Spike Duplicate Result
%MS = Percent Recovery of MS: {(MS-R1)/SP} X 100.
%MSD = Percent Recovery of MSD: {(MSD-R1)/SP} X 100.
RPD = Relative Percent Difference: {(MS - MSD)/(MS + MSD)} X 100 X 2
ACP%MS(MSD) = Acceptable Range of Percent.
ACP RPD = Acceptable Relative Percent Difference

2 . Laboratory Quality Control check sample

Date Performed : 10/06/98

LAB Sample I . D . : OCA 5652

ANALYTE	SPK CONC	RESULTS	%RECOVERY	ACP %
1,1-Dicholoroethane	50	47	94	80 -120
Carbon tetrachloride	50	48	96	80 -120
Ethylbenzene	50	44	88	80 -120
Tetrachloroethene	50	45	90	80 -120

ANALYST: Mitra Samiei DATE: 10/08/98

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8260 QA / QC REPORT

Reporting Unit : µg/l

1 . Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Date Performed : 10/07/98

LAB Sample I . D . : 98100027

Analyte	R1	SP CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD
1,1-Dichloroethene	0.0	20	18	18	90	90	0	61-145	14
Benzene	0.0	20	17	17	85	85	0	76-127	11
Trihloroethene	0.0	20	17	18	85	90	6	71-120	14
Toluene	0.0	20	17	17	85	85	0	76-125	13
Chlorobenzene	0.0	20	18	18	90	90	0	75-130	13

R1 = Result of Laboratory Sample I.D.
SPK CONC = Spiking Concentration ($\leq$5 X PQL) ; PQL = Practical Quantitation Limit.
MS = Matrix Spike Result
MSD = Matrix Spike Duplicate Result
%MS = Percent Recovery of MS: {(MS-R1)/SP} X 100.
%MSD = Percent Recovery of MSD: {(MSD-R1)/SP} X 100.
RPD = Relative Percent Difference: {(MS - MSD)/(MS + MSD)} X 100 X 2
ACP%MS(MSD) = Acceptable Range of Percent.
ACP RPD = Acceptable Relative Percent Difference

2 . Laboratory Quality Control check sample

Date Performed : 10/07/98

LAB Sample I . D . : OCA 5652

ANALYTE	SPK CONC	RESULTS	%RECOVERY	ACP %
1,1-Dicholoroethane	50	48	96	80 -120
Carbon tetrachloride	50	53	106	80 -120
Ethylbenzene	50	46	92	80 -120
Tetrachloroethene	50	47	94	80 -120

ANALYST: Mitra Samiei DATE: 10/08/98

Erler & Kalinowski, Inc.

CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST

Project Number: 961025.02

Project Name: WEBB

Source of Samples: 934 RAYO AVENUE

Location: EXTERIOR / INTERIOR RELIABLE STEEL

Analytical Laboratory: ORANGE COAST

Date Sampled: 10/1/98

Sampled By: RCH

Report Results To: STEVE MILLER

Phone Number: (310) 314-8855

Lab Sample I D	Field Sample I D	Sample Type	Number and Type of Containers	Time Collected	Analyses Requested (EPA Method Number)	Results Required By (Date/Time)
	CPT-1-55	WATER	2 x VOA w/HCl	9:50	8260	NORMAL
	CPT-1-95	↓	↓	8:30	↓	↓
	CPT-3			12:00		
	CPT-5			14:15		
	CPT-2			16:15		
	ERB-1001			16:20	HOLD	
	CPT-4A			17:50	8260	
	CPT-4B	↓	↓	18:00	8260	
	TRAVEL BLANK	WATER	1 x VOA		HOLD	

Special Instructions:

Relinquished By: Name / Signature / Affiliation	Date	Time	Received By: Name / Signature / Affiliation
BRIAN AUCHARD / [signature] EKI	10/2/98	15:30	Mehraz Hashemi / Mehraz Hashemi / OCAL 10-02-98 15:30.

066000

CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST

Erler & Kalinowski, Inc.

Project Number: 961025.02

Project Name: WRB

Source of Samples: 5030 Firestone Blvd.

Location: Exterior/Interior Blaka River Bldg.

Analytical Laboratory: ORANGE COAST

Date Sampled: 10/2/98

Sampled By: RCH

Report Results To: Steve Miller

Phone Number: (310) 314-8055

Lab Sample I D	Field Sample I D	Sample Type	Number and Type of Containers	Time Collected	Analyses Requested (EPA Method Number)	Results Required By (Date/Time)
	CPT-7	WATER	2 x VOA w/HCl	8:10	8260	Normal
	CPT-6	"	"	10:30	"	"
	CPT-8	"	"	12:55	"	"
	CPT-9	"	"	14:45	"	"

Special Instructions:

Relinquished By: Name / Signature / Affiliation	Date	Time	Received By: Name / Signature / Affiliation
Brian Anchard / [signature] /EKI	10/2/98	15:30 EDA	Mahran Hashemi / Mahran Hashemi / OCAT. 10-02-98 15:30

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APPENDIX C

Boring Logs

Boring & Well Construction Log

Erler & Kalinowski, Inc.

BOREHOLE LOCATION	Webb at Reliable Steel Property				BOREHOLE/ WELL NAME	MW-04	
DRILLING COMPANY	West Hazmat				PROJECT NAME	Webb- Monitoring Wells	
DRILLING METHOD	Hollow Stem Auger				PROJECT NUMBER	961025.02	
CONDUCTOR CASING		DIAMETER (inches)		FROM (feet) TO	DATE STARTED	10/28/98	DATE COMPLETED 10/28/98
BLANK CASING	PVC	DIAMETER (inches)	4.00in	FROM (feet) 0.0' TO 40.00'	BOREHOLE SIZE	10.00in	TOTAL DEPTH (feet) 70.00'
PERFORATED CASING	Slotted 0.010in	DIAMETER (inches)	4.00in	FROM (feet) 40.00' TO 70.00'	DATUM	Mean Sea Level	
GROUT	Bentonite			FROM (feet) 0.00' TO 33.00'	TOP OF CASING		GROUND SURFACE
SEAL	Bentonite Pellets			FROM (feet) 33.00' TO 38.00'	LOGGED BY	Rob Hesse	
ANNULAR FILL	Sand Filter			FROM (feet) 38.00' TO 70.00'	CERTIFIED BY	Beth Lamb, CEG	

REMARKS: 1.5-inch O.D. Split Spoon Sampler
Well Completion: 12-inch surface housing

SAMPLES: TIME COLLECTED	SAMPLE No.	SAMPLE	RECOVERY (ft)	BLOW COUNT	OVM (ppmV)	DEPTH (ft)	MATERIAL DESCRIPTION	Water Level	USCS Code	Graphic Log	WELL CONSTRUCTION	NOTES
						1	SANDY SILT; grayish brown (10YR5/2); 15% clay, 35% sand; fine grained sand; micaceous; soft; moist.		ML			Asphalt 4 to 6 inches. Location is 2 feet north of CPT-1.
						2						
						3						
						4						
			0.5	3		5	Color change to dark greyish brown (10YR4/2)					
			0.5	2								
			0.5	3		6						
						7						
						8						
						9						
07:45	MW-4-10.5		0.5	3		10	Increase clay to 25%, decrease sand to 20%.					
			0.5	4								
			0.5	5		11						

BOREHOLE LOCATION MW-04 | PROJECT NAME Webb- Monitoring Wells | PROJECT NUMBER 961025.02

Erler & Kalinowski, Inc.

Boring & Well Construction Log

SAMPLES							MATERIAL DESCRIPTION	Water Level	USCS Code	Graphic Log	WELL CONSTRUCTION	NOTES
TIME COLLECTED	SAMPLE No.	SAMPLE	RECOVERY (ft)	BLOW COUNT	OVM (ppmV)	DEPTH (ft)						
						13						
						14						
			0.5	3		15	Decrease clay to 15%, increase sand to 35%.					
			0.5	4								
			0.5	5		16						
						17						
						18						
						19						
			0.5	5		20	CLAYEY SILT; dark grey (10YR4/1); 35% clay, 15% sand; fine grained sand; micaceous; soft; low plasticity; low toughness; low dry strength; moist.		ML			
			0.5	7								
08:00	MW-4-21.5		0.5	9		21						
						22						
						23						
						24	SANDY SILT; dark greyish brown (10YR4/2); 15% clay, 25% sand; fine grained sand; micaceous; soft; moist.		ML			
				4		25						
				5								
				6		26	CLAYEY SILT; greenish grey (10Y5/1); 40% clay, 10% sand; fine grained sand; micaceous; soft; medium plasticity; low toughness; low dry strength; moist.		ML			
						27						
						28						

BOREHOLE LOCATION MW-04 PROJECT NAME Webb– Monitoring Wells PROJECT NUMBER 961025.02

Erler & Kalinowski, Inc.

Boring & Well Construction Log

SAMPLES							MATERIAL DESCRIPTION	Water Level	USCS Code	Graphic Log	WELL CONSTRUCTION	NOTES
TIME COLLECTED	SAMPLE No.	SAMPLE	RECOVERY (ft)	BLOW COUNT	OVM (ppmV)	DEPTH (ft)						
			0.5	5		30						
			0.5	8			SILTY SAND; greyish brown (2.5YR5/2); 15% clay, 40% silt; fine grained sand; micaceous; firm; moist.		ML			
08:10	MW-4-31.5		0.5	10		31						
						32						
						33						
						34						
			0.5	14		35	SILTY SAND; light brownish grey (2.5YR6/2); 5% clay, 30% silt; fine grained sand; micaceous; quartzitic; loose; slightly moist.		SM			
			0.5	20								
			0.5	32		36						
						37						
						38						
						39						
			0.5	15		40	SANDY SILT; dark greyish brown (10YR4/2); 15% clay, 35% sand; fine grained sand; micaceous; firm; moist.		ML			
			0.5	16								
08:20	MW-4-41.5		0.5	20		41						
						42						
						43						
						44						
				11		45	SILTY SAND; dark grey (10YR4/1); 10% clay, 30% silt; fine grained sand; micaceous; quartzitic; hornblende; soft; moist to wet.		SM			
				13								

BOREHOLE LOCATION MW-04 PROJECT NAME Webb- Monitoring Wells PROJECT NUMBER 961025.02

Erler & Kalinowski, Inc.

Boring & Well Construction Log

SAMPLES							MATERIAL DESCRIPTION	Water Level	USCS Code	Graphic Log	WELL CONSTRUCTION	NOTES
TIME COLLECTED	SAMPLE No.	SAMPLE	RECOVERY (ft)	BLOW COUNT	OVM (ppmV)	DEPTH (ft)						
				15		47						
						48						
						49						
			0.5	10		50	SANDY SILT; dark grey (2.5YR4/1); 15% clay, 40% sand; fine grained sand; micaceous; soft; wet.		ML			
			0.5	12								
			0.5	16		51						
						52						
						53						
						54						
				7		55						
				8								
				8		56						
						57						
						58						
						59						
			0.5	10		60	SANDY SILT, greenish grey (10Y5/1); 15% clay, 25% sand; fine grained sand; micaceous; soft; wet.					
			0.5	11								
			0.5	10		61						
						62						

BOREHOLE LOCATION MW-04 PROJECT NAME Webb– Monitoring Wells PROJECT NUMBER 961025.02

Erler & Kalinowski, Inc.

Boring & Well Construction Log

SAMPLES							MATERIAL DESCRIPTION	Water Level	USCS Code	Graphic Log	WELL CONSTRUCTION	NOTES
TIME COLLECTED	SAMPLE No.	SAMPLE	RECOVERY (ft)	BLOW COUNT	OVM (ppmV)	DEPTH (ft)						
						64						
			0.5	11		65	SAND; greenish grey (10Y5/1); with black (N1); 15% silt; fine to medium grained; quartzitic; arkosic; hornblende; subangular grains; well graded; dense; saturated.		SW			
			0.5	50/6								
			0.5			66						
						67						
						68						
						69						
						70	Total Depth of borehole 70 feet.					Total depth: 70 feet.
						71						
						72						
						73						
						74						
						75						
						76						
						77						
						78						
						79						

Boring & Well Construction Log

Erler & Kalinowski, Inc.

BOREHOLE LOCATION	Webb at Reliable Steel Property				BOREHOLE/ WELL NAME	MW-05	
DRILLING COMPANY	West Hazmat				PROJECT NAME	Webb- Monitoring Wells	
DRILLING METHOD	Hollow-Stem Auger (CME-75)				PROJECT NUMBER	961025.02	
CONDUCTOR CASING		DIAMETER (inches)		FROM (feet) TO	DATE STARTED	10/28/98	DATE COMPLETED 10/28/98
BLANK CASING	PVC	DIAMETER (inches)	4.00in	FROM (feet) 0.0' TO 40.00'	BOREHOLE SIZE	10.00in	TOTAL DEPTH (feet) 70.00'
PERFORATED CASING	Slotted 0.010in	DIAMETER (inches)	4.00in	FROM (feet) 40.00' TO 70.00'	DATUM	NGVD 1929	
GROUT	Bentonite			FROM (feet) 0.00' TO 33.00'	TOP OF CASING		GROUND SURFACE
SEAL	Bentonite Pellets			FROM (feet) 33.00' TO 38.00'	LOGGED BY	Rob Hesse	
ANNULAR FILL	Sand Filter			FROM (feet) 38.00' TO 70.00'	CERTIFIED BY	Beth Lamb, CEG	

REMARKS: 1.5-inch O.D. Split Spoon Sampler

SAMPLES							MATERIAL DESCRIPTION	Water Level	USCS Code	Graphic Log	WELL CONSTRUCTION	NOTES
TIME COLLECTED	SAMPLE No.	SAMPLE	RECOVERY (ft)	BLOW COUNT	OVM (ppmV)	DEPTH (ft)						
						1	SILTY SAND; Grayish brown (10YR5/2); 15% clay, 30% silt; fine grained sand; micaceous; loose; moist.		SM			Asphalt 4-6 inches.
						2						
						3						
						4						
			0.5	3		5	Decrease fines to 10% clay, 25% silt.					
			0.5	3								
			0.5	3		6						
						7						
						8						
						9						
			0.5	3		10	SANDY SILT; grayish brown (10YR5/2); 15% clay, 35% sand; fine grained sand; micaceous; soft to firm; moist to wet.		ML			
	MW-5-11		0.5	3								
			0.5	4		11						

BOREHOLE LOCATION MW-05 PROJECT NAME Webb- Monitoring Wells PROJECT NUMBER 961025.02

Erler & Kalinowski, Inc.

Boring & Well Construction Log

SAMPLES												
TIME COLLECTED	SAMPLE No.	SAMPLE	RECOVERY (ft)	BLOW COUNT	OVM (ppmV)	DEPTH (ft)	MATERIAL DESCRIPTION	Water Level	USCS Code	Graphic Log	WELL CONSTRUCTION	NOTES
						13						
						14						
			0.5	6		15	Increase fines to 20% clay, 25% sand; slightly plastic; firm; wet.					
			0.5	9								
			0.5	13		16						
						17						
						18						
						19						
			0.5	3		20	SILTY SAND, greyish brown (10YR5/2); 15% clay, 30% silt; fine-grained sand; micaceous; soft; moist.		SM			
	MW-5-21		0.5	5								
			0.5	11		21			ML			
						22	CLAYEY SILT with SAND, grayish brown (2.5Y5/2); 25% clay, 15% sand; fine-grained sand; micaceous; low plasticity; low toughness; low dry strength; firm; moist.					
						23						
						24						
			0.5	11		25	SILTY SAND, grayish brown (10YR5/2); 15% clay, 30% silt; fine-grained sand; soft; moist.		SM			
			0.5	7								
			0.5	8		26	SILTY CLAY, grayish brown (2.5Y5/2); 35% silt, 25% sand; fine-grained sand; micaceous, medium plasticity; low toughness; low dry strength; soft to firm, moist.		CL			
						27						
						28						

BOREHOLE LOCATION MW-05 PROJECT NAME Webb– Monitoring Wells PROJECT NUMBER 961025.02

Erler & Kalinowski, Inc.

Boring & Well Construction Log

SAMPLES												
TIME COLLECTED	SAMPLE No.	SAMPLE	RECOVERY (ft)	BLOW COUNT	OVM (ppmV)	DEPTH (ft)	MATERIAL DESCRIPTION	Water Level	USCS Code	Graphic Log	WELL CONSTRUCTION	NOTES
			0.5	6		30			SM			
	MW-5-31		0.5	11								
			0.4	12		31	SILTY SAND, dark grayish frown (10YR4/2); 15% clay 30% silt; fine grained sand; micaceous; soft to firm; moist.					
						32						
						33						
						34						
			0.5	15		35	SILTY SAND, light brownish gray (2.5Y6/2); 5% clay, 15% sit; fine to medium grained sand; micaceous; quartzitic; poorly graded; soft; moist.					
			0.5	20								
			0.5	20		36						
						37						
						38						
						39						
			0.5	8		40	SANDY SILT, dark greenish gray (10Y4/1); 15% clay, 35% sand; fine grained sand; micaceous; soft to firm; moist.		ML			
	MW-5-41		0.5	8								
			0.5	11		41						
						42						
						43						
						44						
				8		45	Increase sand to 45%; moist to wet.					
				13								

BOREHOLE LOCATION MW-05 PROJECT NAME Webb- Monitoring Wells PROJECT NUMBER 961025.02

Erler & Kalinowski, Inc.

Boring & Well Construction Log

SAMPLES							MATERIAL DESCRIPTION	Water Level	USCS Code	Graphic Log	WELL CONSTRUCTION	NOTES
TIME COLLECTED	SAMPLE No.	SAMPLE	RECOVERY (ft)	BLOW COUNT	OVM (ppmV)	DEPTH (ft)						
				15								
						47						
						48						
						49						
			0.5	7		50	Decrease sand to 30%, increase clay to 20%; non-plastic.					
			0.5	9								
			0.3	14		51						
						52						
						53						
						54						
			0.5	10		55	Increase sand to 40%, decrease clay to 15%; wet.					
			0.5	12								
			0.5	15		56						
						57						
						58						
						59						
			0.5	10		60	SILTY SAND, dark greenish gray (10Y4/1); 10% clay 30% silt; fine to medium grained sand; micaceous; quartzitic; poorly graded; soft; wet to saturated.		SM			
			0.5	15								
			0.5	16		61						
						62						

BOREHOLE LOCATION MW-05 PROJECT NAME Webb– Monitoring Wells PROJECT NUMBER 961025.02

Erler & Kalinowski, Inc.

Boring & Well Construction Log

SAMPLES							MATERIAL DESCRIPTION	Water Level	USCS Code	Graphic Log	WELL CONSTRUCTION	NOTES
TIME COLLECTED	SAMPLE No.	SAMPLE	RECOVERY (ft)	BLOW COUNT	OVM (ppmV)	DEPTH (ft)						
						64						
			0.5	10		65	SILTY SAND, dark greenish gray (10Y4/1); 5% clay, 15% silt; fine to medium grained sand; quartzitic, arkosic, with hornblende; subangular; poorly graded; dense; saturated.		SP			
			0.5	20								
			0.5	50 /6		66						
						67						
						68						
						69	SANDY SILT, greenish gray (10Y5/1); 15% clay; 25% sand; fine grained sand; micaceous; soft to firm; saturated.		ML			
						70	Total Depth of borehole: 70 feet					
						71						
						72						
						73						
						74						
						75						
						76						
						77						
						78						
						79						

APPENDIX D

Laboratory Reports and Chain-of-Custody Forms for Soil Sampling

ORANGE COAST ANALYTICAL, INC.
3002 Dow, Suite 532, Tustin, CA 92780 (714) 832-0064 Fax (714) 832-0067
4620 E. Elwood, Suite 4, Phoenix, AZ 85040 (602) 736-0960 Fax (602) 736-0970

LABORATORY REPORT FORM

Laboratory Name: ORANGE COAST ANALYTICAL, INC.

Address: 3002 Dow Suite 532 Tustin, CA 92780

Telephone: (714) 832-0064

Laboratory Certification
(ELAP) No.: 1416 Expiration Date: 1999

Laboratory Director's Name (Print) : Mark Noorani

Client: Erler & Kalinowski, Inc.

Project No.: 961025.02

Project Name: Webb

Laboratory Reference: EKI 10529

Analytical Method: EPA 8260

Date Sampled: 10/28/98
Date Received: 10/28/98
Date Reported: 11/04/98

Sample Matrix: Soil

Chain of Custody Received: Yes

Laboratory Director's Signature: Mark Noorani

ORANGE COAST ANALYTICAL, INC.
3002 Dow, Suite 532, Tustin, CA 92780 (714) 832-0064 Fax (714) 832-0067
4620 E. Elwood, Suite 4, Phoenix, AZ 85040 (602) 736-0960 Fax (602) 736-0970

ANALYTICAL TEST RESULTS 8260

Reporting Unit: ug/kg

DATE ANALYZED		10/30/98	10/30/09	10/30/98	10/29/98
LAB SAMPLE I.D.			98100263	98100264	98100265
CLIENT SAMPLE I.D.			MW-5-21	MW-5-31	MW-5-41
COMPOUND	*MDL*	*MB*			
Acetone	5.0	5.0	<5.0	<5.0	<100
Benzene	2.5	2.5	<2.5	<2.5	<50
Bromodichloromethane	2.5	2.5	<2.5	<2.5	<50
Bromoform	2.5	2.5	<2.5	<2.5	<50
Bromomethane	5.0	5.0	<5.0	<5.0	<100
2-Butanone	5.0	5.0	<5.0	<5.0	<100
Carbon Disulfide	2.5	2.5	<2.5	<2.5	<50
Carbon Tetrachloride	2.5	2.5	<2.5	<2.5	<50
Chlorobenzene	2.5	2.5	<2.5	<2.5	<50
Chlorodibromomethane	2.5	2.5	<2.5	<2.5	<50
Chloroethane	5.0	5.0	<5.0	<5.0	<100
2-Chloroethyl vinyl ether	2.5	2.5	<2.5	<2.5	<50
Chloroform	2.5	2.5	<2.5	<2.5	<50
Chloromethane	2.5	2.5	<2.5	<2.5	<50
1,1-Dichloroethane	2.5	2.5	<2.5	<2.5	<50
1,2-Dichloroethane	2.5	2.5	<2.5	<2.5	<50
1,1-Dichloroethene	2.5	2.5	<2.5	<2.5	<50
cis 1,2-Dichloroethene	2.5	2.5	<2.5	<2.5	<50
Trans 1,2-Dichloroethene	2.5	2.5	<2.5	<2.5	<50
1,2-Dichloropropane	2.5	2.5	<2.5	<2.5	<50
cis-1,3-Dichloropropene	2.5	2.5	<2.5	<2.5	<50
trans-1,3-Dichloropropene	2.5	2.5	<2.5	<2.5	<50
Ethylbenzene	2.5	2.5	<2.5	<2.5	<50
2-Hexanone	5.0	5.0	<5.0	<5.0	<100
Methylene chloride	5.0	5.0	<5.0	<5.0	<100
4-Methyl-2-pentanone	5.0	5.0	<5.0	<5.0	<100
Styrene	2.5	2.5	<2.5	<2.5	<50
1,1,2,2-Tetrachloroethane	2.5	2.5	<2.5	<2.5	<50
Tetrachloroethene	2.5	2.5	<2.5	<2.5	<50
Toluene	2.5	2.5	<2.5	<2.5	<50
1,1,1-Trichloroethane	2.5	2.5	<2.5	<2.5	<50
1,1,2-Trichloroethane	2.5	2.5	<2.5	<2.5	<50
Trichloroethene	2.5	2.5	22	11	550
Trichlorofluoromethane	5.0	5.0	<5.0	<5.0	<100
Vinyl acetate	5.0	5.0	<5.0	<5.0	<100
Vinyl Chloride	2.5	2.5	<2.5	<2.5	<50
Total Xylenes	2.5	2.5	<2.5	<2.5	<50

SURROGATE	SPK	ACP%	MB			
RECOVERY	CONC		%RC			
Dibromofluoromethane		80-120	91	91	97	89
Toluene-d8		81-117	93	101	101	99
4-Bromofluorobenzene		74-121	96	96	97	99

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4620 E. Elwood, Suite 4, Phoenix, AZ 85040 (602) 736-0960 Fax (602) 736-0970

8260 QA / QC REPORT
Reporting Unit : µg/kg

1 . Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Date Performed :10/30/98

LAB Sample I . D . : 98100263

Analyte	R1	SP CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD
1,1-Dichloroethene	0.0	50	51	53	102	106	4	59-172	22
Benzene	0.0	50	49	52	98	104	6	66-142	21
Trichloroethene	8.7	50	66	72	115	127	9	62-132	24
Toluene	0.0	50	47	51	94	102	8	59-139	21
Chlorobenzene	0.0	50	49	53	98	106	8	60-133	21

R1 = Result of Laboratory Sample I.D.
SPK CONC = Spiking Concentration ($\leq$5 X PQL) ; PQL = Practical Quantitation Limit.
MS = Matrix Spike Result
MSD = Matrix Spike Duplicate Result
%MS = Percent Recovery of MS: {(MS-R1)/SP} X 100.
%MSD = Percent Recovery of MSD: {(MSD-R1)/SP} X 100.
RPD = Relative Percent Difference: {(MS - MSD)/(MS + MSD)} X 100 X 2
ACP%MS(MSD) = Acceptable Range of Percent.
ACP RPD = Acceptable Relative Percent Difference

2 . Laboratory Quality Control check sample

Date Performed : 10/30/98

LAB Sample I . D . : OCA 5652

ANALYTE	SPK CONC	RESULTS	%RECOVERY	ACP %
1,1-Dicholoroethane	50	50	100	80 -120
Carbon tetrachloride	50	49	98	80 -120
Ethylbenzene	50	48	96	80 -120
Tetrachloroethene	50	48	96	80 -120

ANALYST: Mitra Samiei DATE: 10/30/98

CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST

Erler & Kalinowski, Inc.

Project Number: 961025.02

Project Name: WEBB

Source of Samples: WELLS MW-4 AND MW-5 BORINGS

Location: RAWABLE STEEL PROPERTY

Analytical Laboratory: ORANGE COAST

Date Sampled: 10/28/98

Sampled By: RCH

Report Results To: STEVE MILLER

Phone Number: (310) 314-8855

Lab Sample I D	Field Sample I D	Sample Type	Number and Type of Containers	Time Collected	Analyses Requested (EPA Method Number)	Results Required By (Date/Time)
	MW-4-10.5	SOIL	1 x BRASS	7:45	HOLD	
	MW-4-21.5	"	"	8:00	"	
	MW-4-31.5	"	"	8:10	"	
	MW-4-41.5	"	"	8:20	"	
	MW-5-11	"	"	12:15	"	
	MW-5-21	"	"	12:20	"	
	MW-5-31	"	"	12:30	"	
	MW-5-41	"	"	12:40	"	

Special Instructions:

Relinquished By: Name / Signature / Affiliation	Date	Time	Received By: Name / Signature / Affiliation
ROB HESSE / [signature] /EKI	10/28/98	16:15	
[signature] OCA	10/28/98	16:15	

001007

APPENDIX E

Groundwater Purge and Water Quality Monitoring Forms
for Well Development and Groundwater Sampling

GROUNDWATER PURGE AND WATER QUALITY MONITORING FORM

Erler & Kalinowski, Inc.

PROJECT NAME: WEBB DATE: 11/3/98

PROJECT NUMBER: 961026.02 WELL NUMBER: MW-4 PERSONNEL: RCH

WELL VOLUME CALCULATION:

Depth of Well (ft.)		Depth to Water (ft.)		Water Column (ft.)		Multiplier (below)		Casing Vol. (gallons)
69.1'	-	42.77'	=		*		=	

Mult. for casing diam. = 2-in.=0.16; 4-in.=0.64; 5-in.=1.02; 6-in.=1.44 gals/ft.

No. of bailers prior to start of purge: 19 3 GALLONS PER BAILER

PURGE METHOD:

PURGE DEPTH: 2" SUBMERSIBLE ELECTRIC PUMP

START TIME: 10:41 END TIME: 11:07

TOTAL GALLONS PURGED: 110 + 55 (BAILER)

INSTRUMENT CALIBRATION

Instrument	Field measure	Standard measure
Conductivity	1.08	1.00
pH	3.94	4.01
pH	6.97	7.00
Turbidity	0.20	0.20
Temperature		
Depth Probe		

Time	10:40	10:46	10:49	10:53	10:56	11:00	11:03	11:07
Volume Purged (gallons)	55	18	30	40	50	65	75	90
Temperature (degrees F or C)	-	72.3	70.7	70.4	70.2	70.0	69.6	70.0
pH (units)	-	6.28	6.86	6.98	7.04	7.10	7.14	7.16
Specific Conductivity (uS/cm)	-	3.57	3.54	3.52	3.51	3.49	3.43	3.44
Turbidity/Color (NTU)	-	>200	110.6	52.5	20.0	10.6	4.3	1.78
Odor	-							
Depth to Water (ft below TOC) during purge	-							
Number of Casing Volumes removed								
Purge Rate (gallons/minute)								

COMMENTS/ SAMPLES:

Field I.D.	Time Collected	Containers & Preservation	Analyses Requested

GROUNDWATER PURGE AND WATER QUALITY MONITORING FORM

Erler & Kalinowski, Inc.

PROJECT NAME: WEBB DATE: 11/3/98

PROJECT NUMBER: 961025.02 WELL NUMBER: MW-5 PERSONNEL: RCH

WELL VOLUME CALCULATION:

Depth of Well (ft.)		Depth to Water (ft.)		Water Column (ft.)		Multiplier (below)		Casing Vol. (gallons)
68.4'	-	43.32'	=		*		=	

Mult. for casing diam. = 2-in.=0.16; 4-in.=0.64; 5-in.=1.02; 6-in.=1.44 gals/ft.

No. of bailers prior to start of purge: 13 (3 GALLONS PER BAILER)

PURGE METHOD:

PURGE DEPTH: 2" SUBMERSIBLE, ELECTRIC PUMP

START TIME: 12:28 END TIME: 13:06

TOTAL GALLONS PURGED: 125 + 40 BAILER

INSTRUMENT CALIBRATION

Instrument	Field measure	Standard measure
Conductivity	SEE LOG FOR WELL MW-4	
pH		
pH		
Turbidity		
Temperature		
Depth Probe		

Time	12:26	12:36	12:41	12:46	12:49	12:55	13:01	13:05
Volume Purged (gallons)	40	30	45	60	70	90	110	120
Temperature (degrees F or C)	-	72.8	71.1	70.9	70.4	70.2	70.2	70.2
pH (units)	-	7.69	7.38	7.29	7.28	7.28	7.25	7.25
Specific Conductivity (uS/cm)	-	2.70	2.97	3.22	3.42	3.67	3.84	3.87
Turbidity/Color (NTU)	-	>200	180	80	40.5	12.6	8.5	4.90
Odor	-							
Depth to Water (ft below TOC) during purge	-							
Number of Casing Volumes removed								
Purge Rate (gallons/minute)								

COMMENTS/ SAMPLES:

Field I.D.	Time Collected	Containers & Preservation	Analyses Requested

GROUNDWATER PURGE AND WATER QUALITY MONITORING FORM

Erler & Kalinowski, Inc.

PROJECT NAME: WEBB DATE: 11/5/98

PROJECT NUMBER: 961025.02 WELL NUMBER: MW-4 PERSONNEL: RCH

WELL VOLUME CALCULATION:

Depth of Well (ft.)		Depth to Water (ft.)		Water Column (ft.)	Multiplier (below)	Casing Vol. (gallons)
~ 69'	-	42.64'	=	26.36'	* 0.64	= 16.87

Mult. for casing diam. = 2-in.=0.16; 4-in.=0.64; 5-in.=1.02; 6-in.=1.44 gals/ft.

No. of bailers prior to start of purge: Ø

PURGE METHOD: 2" SUBMERSIBLE ELECTRIC PUMP

PURGE DEPTH: ~ 45' BGS

START TIME: 8:13 END TIME: 8:37

TOTAL GALLONS PURGED: 55 gals

INSTRUMENT CALIBRATION

Instrument	Field measure	Standard measure
Conductivity	1.09	1.00
pH	4.03	4.01
pH	6.94	7.00
Turbidity	0.2	0.2
Temperature	70.6°F	
Depth Probe		

Time	8:23	8:27	8:31	8:35				
Volume Purged (gallons)	20	30	40	50				
Temperature (degrees F or C)	68.3	68.6	68.4	66.6				
pH (units)	6.25	6.80	6.95	7.01				
Specific Conductivity (uS/cm)	3.37	3.42	3.41	3.41				
Turbidity/Color (NTU)	4.7	1.35	0.50	0.46				
Odor	No	No	No	No				
Depth to Water (ft below TOC) during purge	43.42'	43.44'	43.44	-				
Number of Casing Volumes removed								
Purge Rate (gallons/minute)								

COMMENTS/ SAMPLES:	Field I.D.	Time Collected	Containers & Preservation	Analyses Requested
	MW-4	8:50	3 x VOA w/HCl	8260
	MW-4	8:55	1 x amber L	Hold

CONTROLLER = 200 Hz

GROUNDWATER PURGE AND WATER QUALITY MONITORING FORM

Erler & Kalinowski, Inc.

PROJECT NAME: WEBB DATE: 11/5/98

PROJECT NUMBER: 961025.02 WELL NUMBER: MW-2 PERSONNEL: RCH

WELL VOLUME CALCULATION:

Depth of Well (ft.)		Depth to Water (ft.)		Water Column (ft.)		Multiplier (below)		Casing Vol. (gallons)
~ 69'	-	42.64'	=	26.36	*	0.64	=	16.87

Mult. for casing diam. = 2-in.=0.16; 4-in.=0.64; 5-in.=1.02; 6-in.=1.44 gals/ft.

No. of bailers prior to start of purge: Ø

PURGE METHOD: 2" SUBMERSIBLE ELECTRIC PUMP

PURGE DEPTH: ~ 45' BGS, MOVE TO 50' BGS 9:34 55' 9:40

START TIME: 9:24 END TIME: 10:05

TOTAL GALLONS PURGED: → 180 Hz

INSTRUMENT CALIBRATION

Instrument	Field measure	Standard measure
Conductivity		
pH	SEE LOG FOR	
pH	WELL MW-4	
Turbidity		
Temperature		
Depth Probe		

Time	9:35	9:45	9:53	10:01	10:05			
Volume Purged (gallons)	20	30	40	50	55			
Temperature (degrees F or C)	70.2	69.2	69.1	69.0	69.0			
pH (units)	7.28	7.28	7.31	7.35	7.37			
Specific Conductivity (uS/cm)	2.71	2.52	2.66	2.66	2.66			
Turbidity/Color (NTU)	38.8	20.9	19.5	3.8	2.6			
Odor								
Depth to Water (ft below TOC) during purge	54.43'	52.61'	52.65'	52.69'	-			
Number of Casing Volumes removed								
Purge Rate (gallons/minute)								

COMMENTS/ SAMPLES:

Field I.D.	Time Collected	Containers & Preservation	Analyses Requested
MW-2	10:10	3 x VOA w/HCl	8260
MW-2	10:15	1 x amber L	HOLD
ERB-1105	9:55	3 x VOA w/HCl	HOLD

9:24 CONTROLLER = 200 Hz 9:44 180 Hz

GROUNDWATER PURGE AND WATER QUALITY MONITORING FORM

Erler & Kalinowski, Inc.

PROJECT NAME: WEBB DATE: 11/5/98

PROJECT NUMBER: 961025.02 WELL NUMBER: MW-3 PERSONNEL: RCH

WELL VOLUME CALCULATION:

Depth of Well (ft.)		Depth to Water (ft.)		Water Column (ft.)		Multiplier (below)		Casing Vol. (gallons)
~69	-	43.60'	=	25.40	*	0.64	=	16.25

Mult. for casing diam. = 2-in.=0.16; 4-in.=0.64; 5-in.=1.02; 6-in.=1.44 gals/ft.

No. of bailers prior to start of purge: 0

PURGE METHOD: 2" SUBMORSIBLE PUMP

PURGE DEPTH: 45' BGS

START TIME: 10:40 END TIME: 11:09

TOTAL GALLONS PURGED: 55 gals

INSTRUMENT CALIBRATION

Instrument	Field measure	Standard measure
Conductivity		
pH	SEE LOG FOR	
pH	WELL MW-4	
Turbidity		
Temperature		
Depth Probe		

Time	10:51	10:56	11:01	11:06				
Volume Purged (gallons)	20	30	40	50				
Temperature (degrees F or C)	68.4	67.7	67.1	67.3				
pH (units)	7.54	7.41	7.36	7.33				
Specific Conductivity (uS/cm)	1.39	1.82	2.03	2.10				
Turbidity/Color (NTU)	1.37	0.47	0.57	0.26				
Odor								
Depth to Water (ft below TOC) during purge	43.66'	43.68'	43.70'	-				
Number of Casing Volumes removed								
Purge Rate (gallons/minute)								

COMMENTS/ SAMPLES:	Field I.D.	Time Collected	Containers & Preservation	Analyses Requested
	MW-3	11:10	3 x VOA w/ HCl	8260
	MW-3	11:15	1 x amber L	HOLD

Controller - 200 ft

GROUNDWATER PURGE AND WATER QUALITY MONITORING FORM

Erler & Kalinowski, Inc.

PROJECT NAME: WEBB DATE: 11/5/98

PROJECT NUMBER: 961025.02 WELL NUMBER: MW-5 PERSONNEL: RCH

WELL VOLUME CALCULATION:

Depth of Well (ft.)		Depth to Water (ft.)		Water Column (ft.)		Multiplier (below)		Casing Vol. (gallons)
~69	-	43.30'	=	25.7	*	0.64	=	16.44

Mult. for casing diam. = 2-in.=0.16; 4-in.=0.64; 5-in.=1.02; 6-in.=1.44 gals/ft.

No. of bailers prior to start of purge: Ø

PURGE METHOD: 2" SUBMERSIBLE PUMP

PURGE DEPTH: 45' BGS

START TIME: 12:33 END TIME: 12:02

TOTAL GALLONS PURGED: 55 gals

INSTRUMENT CALIBRATION

Instrument	Field measure	Standard measure
Conductivity		
pH	SEE LOG FOR	
pH	WELL MW-4	
Turbidity		
Temperature		
Depth Probe		

Time	11:43	11:48	11:53	11:58				
Volume Purged (gallons)	20	30	40	50				
Temperature (degrees F or C)	69.1	68.8	68.7	68.7				
pH (units)	7.60	7.48	7.44	7.38				
Specific Conductivity (uS/cm)	2.94	3.23	3.52	3.58				
Turbidity/Color (NTU)	1.50	0.78	0.60	0.60				
Odor								
Depth to Water (ft below TOC) during purge	44.54'	44.60'	44.60'	—				
Number of Casing Volumes removed								
Purge Rate (gallons/minute)								

COMMENTS/ SAMPLES:

Field I.D.	Time Collected	Containers & Preservation	Analyses Requested
MW-5	12:05	3 x VOA w/ HCl	8260
MW-5-DUP	12:10	3 x VOA w/ HCl	8260
MW-5	12:15	1 x amber L	HOLD

Controller = 200 Hz

GROUNDWATER PURGE AND WATER QUALITY MONITORING FORM

Erler & Kalinowski, Inc.

PROJECT NAME: WEBB DATE: 11/5/96

PROJECT NUMBER: 961025.02 WELL NUMBER: MW-1 PERSONNEL: RCH

WELL VOLUME CALCULATION:

Depth of Well (ft.)		Depth to Water (ft.)		Water Column (ft.)	Multiplier (below)		Casing Vol. (gallons)
270	-	43.14'	=	26.86	* 0.64	=	17.19

Mult. for casing diam. = 2-in.=0.16; 4-in.=0.64; 5-in.=1.02; 6-in.=1.44 gals/ft.

No. of bailers prior to start of purge: 0

PURGE METHOD: 2" SUBMERSIBLE ELECTRIC PUMP

PURGE DEPTH: 45' BGS

START TIME: 12:32 END TIME: 12:58

TOTAL GALLONS PURGED: 55 gals

INSTRUMENT CALIBRATION

Instrument	Field measure	Standard measure
Conductivity	SEE LOG FOR WELL MW-4	
pH		
pH		
Turbidity		
Temperature		
Depth Probe		

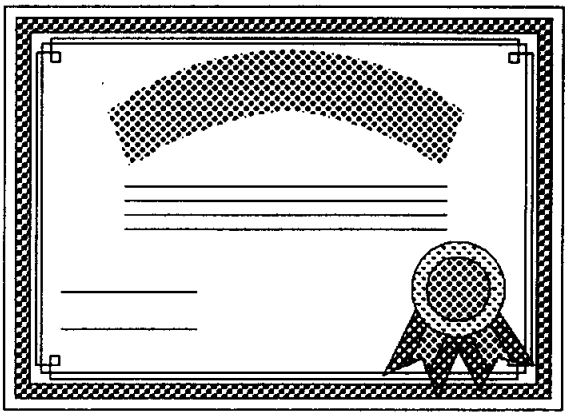
Time	12:41	12:46	12:51	12:56				
Volume Purged (gallons)	20	30	40	50				
Temperature (degrees F or C)	69.4	68.1	68.1	67.9				
pH (units)	7.70	7.54	7.49	7.45				
Specific Conductivity (uS/cm)	1.36	1.22	1.37	1:40				
Turbidity/Color (NTU)	6.93	1.89	0.98	0.80				
Odor								
Depth to Water (ft below TOC) during purge	46.10'	46.24'	46.40'	–				
Number of Casing Volumes removed								
Purge Rate (gallons/minute)								

COMMENTS/ SAMPLES:	Field I.D.	Time Collected	Containers & Preservation	Analyses Requested
	MW-1	11:05	3 x VOA w/ HCl	8260
	MW-1	11:10	1 x amber L	HOLD

APPENDIX F

Laboratory Reports and Chain-of-Custody Forms
for Groundwater Sampling

ORANGE COAST ANALYTICAL, INC.
3002 Dow, Suite 532, Tustin, CA 92780 (714) 832-0064 Fax (714) 832-0067
4620 E. Elwood, Suite 4, Phoenix, AZ 85040 (602) 736-0960 Fax (602) 736-0970



ORANGE COAST ANALYTICAL THANKS YOU FOR YOUR BUSINESS

THE FOLLOWING PAGES ARE THE ANALYSIS REPORT

ON THE SAMPLES YOU REQUESTED.

IF YOU HAVE ANY QUESTIONS REGARDING THIS REPORT

PLEASE FEEL FREE TO CONTACT US.

ORANGE COAST ANALYTICAL, INC.
3002 Dow, Suite 532, Tustin, CA 92780 (714) 832-0064 Fax (714) 832-0067
4620 E. Elwood, Suite 4, Phoenix, AZ 85040 (602) 736-0960 Fax (602) 736-0970

LABORATORY REPORT FORM

Laboratory Name: ORANGE COAST ANALYTICAL, INC.

Address: 3002 Dow Suite 532 Tustin, CA 92780

Telephone: (714) 832-0064

Laboratory Certification
(ELAP) No.: 1416 Expiration Date: 1999

Laboratory Director's Name (Print) : Mark Noorani

Client: Erler & Kalinowski, Inc.

Project No.: 961025.02

Project Name: Webb

Laboratory Reference: EKI 10548

Analytical Method: EPA 8260

Date Sampled: 11/05/98
Date Received: 11/05/98
Date Reported: 11/18/98

Sample Matrix: Water

Chain of Custody Received: Yes

Laboratory Director's Signature: Mark Noorani

ORANGE COAST ANALYTICAL, INC.
3002 Dow, Suite 532, Tustin, CA 92780 (714) 832-0064 Fax (714) 832-0067
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ANALYTICAL TEST RESULTS 8260

Reporting Unit: ug/l

DATE ANALYZED		11/06/98	11/06/98	11/06/98	11/06/98
DILUTION FACTOR		1	1	20	20
LAB SAMPLE I.D.			98110039	98110040	98110041
CLIENT SAMPLE I.D.			MW-4	MW-2	MW-3
COMPOUND	MDL	MB			
Acetone	2.0	2.0	<2.0	<40	<40
Benzene	0.5	0.5	<0.5	<10	<10
Bromodichloromethane	0.5	0.5	<0.5	<10	<10
Bromoform	0.5	0.5	<0.5	<10	<10
Bromomethane	1.0	1.0	<1.0	<20	<20
2-Butanone	1.0	1.0	<1.0	<20	<20
Carbon Disulfide	0.5	0.5	<0.5	<10	<10
Carbon Tetrachloride	0.5	0.5	<0.5	<10	<10
Chlorobenzene	0.5	0.5	<0.5	<10	<10
Chlorodibromomethane	0.5	0.5	<0.5	<10	<10
Chloroethane	0.5	0.5	<0.5	<10	<10
2-Chloroethyl vinyl ether	1.0	1.0	<1.0	<20	<20
Chloroform	0.5	0.5	<0.5	<10	<10
Chloromethane	0.5	0.5	<0.5	<10	<10
1,1-Dichloroethane	0.5	0.5	<0.5	13	11
1,2-Dichloroethane	0.5	0.5	<0.5	<10	<10
1,1-Dichloroethene	0.5	0.5	<0.5	36	66
cis 1,2-Dichloroethene	0.5	0.5	0.67	68	240
Trans 1,2-Dichloroethene	0.5	0.5	<0.5	<10	18
1,2-Dichloropropane	0.5	0.5	<0.5	<10	<10
cis-1,3-Dichloropropene	0.5	0.5	<0.5	<10	<10
trans-1,3-Dichloropropene	0.5	0.5	<0.5	<10	<10
Ethylbenzene	0.5	0.5	<0.5	<10	<10
2-Hexanone	1.0	1.0	<1.0	<20	<20
Methylene chloride	2.5	2.5	<2.5	<50	<50
4-Methyl-2-pentanone	1.0	1.0	<1.0	<20	<20
Styrene	0.5	0.5	<0.5	<10	<10
1,1,2,2-Tetrachloroethane	0.5	0.5	<0.5	<10	<10
Tetrachloroethene	0.5	0.5	<0.5	<10	<10
Toluene	0.5	0.5	<0.5	<10	<10
1,1,1-Trichloroethane	0.5	0.5	<0.5	<10	<10
1,1,2-Trichloroethane	0.5	0.5	<0.5	<10	<10
Trichloroethene	0.5	0.5	6.7	3,200	2,300
Trichlorofluoromethane	0.5	0.5	<0.5	<10	<10
Vinyl acetate	1.0	1.0	<1.0	<20	<20
Vinyl Chloride	0.5	0.5	<0.5	<10	<10
Total Xylenes	0.5	0.5	<0.5	<10	<10

SURROGATE	SPK	ACP%	MB			
RECOVERY	CONC		%RC			
Dibromofluoromethane	20	86-118	88	86	93	91
Toluene-d8	20	88-110	97	98	95	97
4-Bromofluorobenzene	20	86-115	97	96	96	98

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ANALYTICAL TEST RESULTS 8260

Reporting Unit: ug/l

DATE ANALYZED		11/06/98	11/06/98	11/06/98	11/06/98
DILUTION FACTOR		1	50	50	250
LAB SAMPLE I.D.			98110042	98110043	98110044
CLIENT SAMPLE I.D.			MW-5	MW-5-DUP	MW-1
COMPOUND	*MDL*	*MB*			
Acetone	2.0	2.0	<100	<100	<500
Benzene	0.5	0.5	<25	<25	<125
Bromodichloromethane	0.5	0.5	<25	<25	<125
Bromoform	0.5	0.5	<25	<25	<125
Bromomethane	1.0	1.0	<50	<50	<250
2-Butanone	1.0	1.0	<50	<50	<250
Carbon Disulfide	0.5	0.5	<25	<25	<125
Carbon Tetrachloride	0.5	0.5	<25	<25	<125
Chlorobenzene	0.5	0.5	<25	<25	<125
Chlorodibromomethane	0.5	0.5	<25	<25	<125
Chloroethane	0.5	0.5	<25	<25	<125
2-Chloroethyl vinyl ether	1.0	1.0	<50	<50	<250
Chloroform	0.5	0.5	<25	<25	<125
Chloromethane	0.5	0.5	<25	<25	<125
1,1-Dichloroethane	0.5	0.5	<25	<25	<125
1,2-Dichloroethane	0.5	0.5	<25	<25	<125
1,1-Dichloroethene	0.5	0.5	42	40	140
cis 1,2-Dichloroethene	0.5	0.5	380	360	160
Trans 1,2-Dichloroethene	0.5	0.5	30	29	<125
1,2-Dichloropropane	0.5	0.5	<25	<25	<125
cis-1,3-Dichloropropene	0.5	0.5	<25	<25	<125
trans-1,3-Dichloropropene	0.5	0.5	<25	<25	<125
Ethylbenzene	0.5	0.5	<25	<25	<125
2-Hexanone	1.0	1.0	<50	<50	<250
Methylene chloride	2.5	2.5	<125	<125	<625
4-Methyl-2-pentanone	1.0	1.0	<50	<50	<250
Styrene	0.5	0.5	<25	<25	<125
1,1,2,2-Tetrachloroethane	0.5	0.5	<25	<25	<125
Tetrachloroethene	0.5	0.5	<25	<25	170
Toluene	0.5	0.5	<25	<25	<125
1,1,1-Trichloroethane	0.5	0.5	<25	<25	<125
1,1,2-Trichloroethane	0.5	0.5	<25	<25	<125
Trichloroethene	0.5	0.5	5,000	4,800	28,000
Trichlorofluoromethane	0.5	0.5	<25	<25	<125
Vinyl acetate	1.0	1.0	<50	<50	<250
Vinyl Chloride	0.5	0.5	<25	<25	<125
Total Xylenes	0.5	0.5	<25	<25	<125

SURROGATE	SPK	ACP%	MB			
RECOVERY	CONC		%RC			
Dibromofluoromethane	20	86-118	88	95	92	
Toluene-d8	20	88-110	97	96	96	
4-Bromofluorobenzene	20	86-115	97	98	97	

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8260 QA / QC REPORT
Reporting Unit : µg/l

1 . Matrix Spike (MS) / Matrix Spike Duplicate (MSD)

Date Performed :11/06/98

LAB Sample I . D . : 98110039

Analyte	R1	SP CONC	MS	MSD	%MS	%MSD	RPD	ACP %MS	ACP RPD
1,1-Dichloroethene	0.0	20	21	22	105	110	5	61-145	14
Benzene	0.0	20	21	22	105	110	5	76-127	11
Trihloroethene	6.7	20	28	28	107	107	0	71-120	14
Toluene	0.0	20	21	21	105	105	0	76-125	13
Chlorobenzene	0.0	20	22	22	110	110	0	75-130	13

R1 = Result of Laboratory Sample I.D.
SPK CONC = Spiking Concentration (≤5 X PQL) ; PQL = Practical Quantitation Limit.
MS = Matrix Spike Result
MSD = Matrix Spike Duplicate Result
%MS = Percent Recovery of MS: {(MS-R1)/SP} X 100.
%MSD = Percent Recovery of MSD: {(MSD-R1)/SP} X 100.
RPD = Relative Percent Difference: {(MS - MSD)/(MS + MSD)} X 100 X 2
ACP%MS(MSD) = Acceptable Range of Percent.
ACP RPD = Acceptable Relative Percent Difference

2 . Laboratory Quality Control check sample

Date Performed : 11/06/98

LAB Sample I . D . :OCA 5653

ANALYTE	SPK CONC	RESULTS	%RECOVERY	ACP %
1,1-Dicholoroethane	50	48	96	80 -120
Carbon tetrachloride	50	53	106	80 -120
Ethylbenzene	50	50	100	80 -120
Tetrachloroethene	50	51	102	80 -120

ANALYST: Mitra Samiei DATE: 11/06/98

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Erker & Kalinowski, Inc.
ATTN: Mr. Rob Hesse
2951 28th St. Suite 1020
Sabta Monica, CA 90405

Client Project ID: Webb
Client Project #: 961025.02

Sample Description: Water, MW-4

Laboratory Sample #: 98110039

Laboratory Reference #: EKI 10548

Sampled: 11/05/98
Received: 11/05/98
Analyzed: 11/10-17/98
Reported: 11/18/98

Analyte	*EPA Method*	*Detection Limit mg/l*	*Analysis Results mg/l*	
Alkalinity	310.1	10	920	
Calcium	200.7	1.0	370	
Chloride	325.3	1.0	86	
Copper	200.7	0.01	N.D.	
Fluoride	340.1	0.1	N.D.	
Iron	200.7	0.1	0.66	
Magnesium	200.7	0.1	190	
Manganese	200.7	0.01	1.8	
MBAS (Surfactants)	425.1	0.05	N.D.	
Nitrate	353.3	0.01	N.D.	
pH	150.1	-	7.1	
Phosphate	365.2	0.05	0.18	
Potassium	258.1	0.1	19	
Sodium	273.1	1.0	480	
Specific Conductance	120.1	-	5,700	umhos/cm
Sulfate	375.4	5.0	1,850	
TDS	160.1	10	3,600	
Total Hardness	130.2	1.0	1800	
Zinc	200.7	0.01	N.D.	

Analytes reported as N.D. were not present above the stated limit of detection.

Orange Coast Analytical

Mark Noorani
Laboratory Director

ORANGE COAST ANALYTICAL, INC.
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Erker & Kalinowski, Inc.
ATTN: Mr. Rob Hesse
2951 28th St. Suite 1020
Sabta Monica, CA 90405

Client Project ID: Webb
Client Project #: 961025.02

Sample Description: Water, MW-2

Laboratory Sample #: 98110040

Laboratory Reference #: EKI 10548

Sampled: 11/05/98
Received: 11/05/98
Analyzed: 11/10-17/98
Reported: 11/18/98

Analyte	*EPA Method*	*Detection Limit mg/l*	*Analysis Results mg/l*	
Alkalinity	310.1	10	720	
Calcium	200.7	1.0	130	
Chloride	325.3	1.0	51	
Copper	200.7	0.01	N.D.	
Fluoride	340.1	0.1	N.D.	
Iron	200.7	0.1	0.47	
Magnesium	200.7	0.1	94	
Manganese	200.7	0.01	0.93	
MBAS (Surfactants)	425.1	0.05	N.D.	
Nitrate	353.3	0.01	N.D.	
pH	150.1	-	7.3	
Phosphate	365.2	0.05	0.48	
Potassium	258.1	0.1	8.7	
Sodium	273.1	1.0	640	
Specific Conductance	120.1	-	4,200	umhos/cm
Sulfate	375.4	5.0	1,300	
TDS	160.1	10	2,600	
Total Hardness	130.2	1.0	710	
Zinc	200.7	0.01	N.D.	

Analytes reported as N.D. were not present above the stated limit of detection.

Orange Coast Analytical

Mark Noorani
Laboratory Director

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QC DATA REPORT

Analysis : Inorganics

Date of Analysis : 11/12-17/98
Laboratory Sample No : 98110040
Laboratory Reference No : EKI 10548

Analyte	R1 (ppm)	SP (ppm)	MS (ppm)	MSD (ppm)	PR1 %	PR2 %	RPD %
Calcium	13.3	10.0	22.2	22.1	89	88	0
Copper	0.00	0.100	0.112	0.105	112	105	6
Iron	0.05	1.00	1.07	1.08	102	103	1
Magnesium	9.4	10.0	18.2	18.3	88	89	1
Manganese	0.09	1.00	1.07	1.06	98	97	1
Potassium	8.7	5.0	14.5	14.6	115	119	1
Sodium	31.9	10.0	42.1	42.2	103	104	0
Zinc	0.00	0.100	0.108	0.101	108	101	7

Definition of Terms :

R1	Results Of First Analysis
SP	Spike Concentration Added to Sample
MS	Matrix Spike Results
MSD	Matrix Spike Duplicate Results
PR1	Percent Recovery Of MS: {(MS-R1) / SP} x100
PR2	Percent Recovery Of MSD: {(MSD-R1) / SP} x 100
RPD	Relative Percent Difference: {(MS-MSD) / (MS+MSD)} x 100 x 2

ORANGE COAST ANALYTICAL

MARK NOORANI
Laboratory Director

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QC DATA REPORT

Analysis : Inorganics

Date of Analysis : 11/10-12/98
Laboratory Sample No : 98110039 / 98110040
Laboratory Reference No : EKI 10548

Analyte	R1 (ppm)	SP (ppm)	MS (ppm)	MSD (ppm)	PR1 %	PR2 %	RPD %
Alkalinity	0	100	102	96	102	96	6
Chloride	86	50	133	137	94	102	3
Fluoride	0.93	0.40	1.38	1.31	113	95	5
MBAS	0.0	0.5	0.51	0.54	102	108	6
Nitrate	0.00	0.25	0.26	0.25	104	100	4
Phosphate	0.18	0.25	0.40	0.38	88	80	5
Sulfate	24	20	44	46	100	110	4
TDS	2,300	1,000	3,400	3,400	110	110	0

Definition of Terms :

R1	Results Of First Analysis
SP	Spike Concentration Added to Sample
MS	Matrix Spike Results
MSD	Matrix Spike Duplicate Results
PR1	Percent Recovery Of MS: {(MS-R1) / SP} x100
PR2	Percent Recovery Of MSD: {(MSD-R1) / SP} x 100
RPD	Relative Percent Difference: {(MS-MSD) / (MS+MSD)} x 100 x 2

ORANGE COAST ANALYTICAL

MARK NOORANI
Laboratory Director

CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST

Erler & Kalinowski, Inc.

Project Number: 961025.02

Project Name: WEBB

Source of Samples: MONITORING WELLS

Location: WEBB / RELIABLE STEEL

Analytical Laboratory: ORANGE COAST

Date Sampled: 11/5/98

Sampled By: RCH

Report Results To: Steve Miller

Phone Number: (310) 314-8855

Lab Sample I D	Field Sample I D	Sample Type	Number and Type of Containers	Time Collected	Analyses Requested (EPA Method Number)	Results Required By (Date/Time)
	MW-4	WATER	3 x VOA w/ HCl	8:50	8260	
	MW-4		1 x amber L	8:58	HOLD	
	MW-2		3 x VOA w/ HCl	10:10	8260	
	MW-2		1 x amber L	10:15	HOLD	
	ERB-1		3 x VOA w/ HCl	9:55	HOLD	
	MW-3		3 x VOA w/ HCl	11:10	8260	
	MW-3		1 x amber L	11:15	HOLD	
	MW-5		3 x VOA w/ HCl	12:05	8260	
	MW-5-DUP		3 x VOA w/ HCl	12:10	8260	
	MW-5		1 x amber L	12:15	HOLD	

Special Instructions:

Relinquished By: Name / Signature / Affiliation	Date	Time	Received By: Name / Signature / Affiliation
Rob Hebbe / [signature] /EKI	11/5/98	12:30	
[signature]	11/5/98	13:35	

001026

CHAIN OF CUSTODY / SAMPLE ANALYSIS REQUEST

Erler & Kalinowski, Inc.

Project Number: 961025.02

Project Name: WEBB

Source of Samples: MONITORING WELLS

Location: WEBB / RELIABLE STEEL

Analytical Laboratory: ORANGE COAST

Date Sampled: 11/5/98

Sampled By: RCH

Report Results To: STEVE MILLER

Phone Number: (310) 314-8055

Lab Sample I D	Field Sample I D	Sample Type	Number and Type of Containers	Time Collected	Analyses Requested (EPA Method Number)	Results Required By (Date/Time)
	MW-1	WATER	3 x VOA w/HCl	13:05	8260	
	MW-1	WATER	1 x amber L	13:10	HOLD	

Special Instructions:

Relinquished By:
Name / Signature / Affiliation

Name / Signature / Affiliation	Date	Time	Received By: Name / Signature / Affiliation
ROB HESSE / [signature] /EKI	11/5/98	13:30	
[signature]	11/5/98	13:35	

001027